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Standards-based assessment and program efficacy: Comparing service delivery models for students with learning disabilities and their peers without disabilities

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STANDARDS-BASED ASSESSMENT AND PROGRAM EFFICACY: COMPARING SERVICE DELIVERY MODELS FOR STUDENTS WITH LEARNING DISABILITIES AND THEIR PEERS WITHOUT DISABILITIES

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Patricia Ann Popp

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STANDARDS-BASED ASSESSMENT AND PROGRAM EFFICACY:

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DEDICATION

Learning is a journey that must be shared to be fully realized. This dissertation is dedicated to my family whose patience and encouragement were integral to realizing this learning milestone. My husband, Denis, provided enormous support and understanding and my daughters, Christine, Denise, Elizabeth, and Meredith, also shared in the journey gracefully.

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ABSTRACT

The major purposes of this research study were to compare differences in student achievement and teacher perceptions of efficacy between programs using pullout resource room or co-teaching models for delivery of special education services to students with learning disabilities at the third- and fifth-grade level in Virginia. Currently, educators are faced with calls to provide more inclusive services for students with disabilities while helping all students meet the higher academic goals found in standards-based reform. Virginia Standards of Learning Tests and teacher perceptions of service delivery model were analyzed for volunteering teachers in large, suburban, middle class schools. In addition to identifying differences between the two program models based on teacher report, differences in student achievement for students with and without disabilities at varying levels of academic skill were explored.

No significant difference was found in student performance on standards-based assessment measures for students with learning disabilities and their peers without disabilities in classrooms employing a resource room model or co-teaching. However, the data from teachers suggest co-teachers perceive the efficacy of their model more

positively than their peers employing a resource room model. These findings add to the research base on service delivery models; however, there continues to be a lack of definitive data to support one model over the other. Without such support, the beliefs of communities, school personnel, and parents, as well as legislation, litigation, and resources will shape the decisions made in placing students with learning disabilities in programs and creating appropriate service options.

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STANDARDS-BASED ASSESSMENT AND PROGRAM EFFICACY: COMPARING SERVICE DELIVERY MODELS FOR STUDENTS WITH LEARNING DISABILITIES AND THEIR PEERS WITHOUT DISABILITIES

CHAPTER 1

THE PROBLEM

> The focus of special education for individuals with learning disabilities (LD) has shifted from an emphasis on *what* and *how* to teach ... By the 1990's we are being challenged to . . . return students more completely to general education settings while delivering whatever specially designed instruction is needed within the confines of the general education class. (Baker & Zigmond, 1995, p. 163)

As a new century begins, *where* services for students with learning disabilities (LD) are delivered continues to be debated, as do the questions of *what* and *how* services can be delivered in varying settings (Idol, 1997; King-Sears, 1997; Vaughn & Schumm, 1995). "Reformers soon began arguing that place was not enough. The point was not just making sure students with disabilities get to go to school along with everyone else; the point was that they learn important and useful things while they were there" (National Institute for Urban School Improvement, in press).

Placement options for service delivery to individuals with special needs have varied greatly throughout history, marked by conflict and controversy (Wiederholt, 1989). "The pendulum swings gather energy from a combination of irrational and rational beliefs, social and economic conditions, religion, law, and the prevailing level of knowledge" (Wiederholt, 1989, p. 182). In recent years, the pendulum range has shifted gradually to encompass more normalized, integrated, or inclusive possibilities. Today

individuals with disabilities have greater access to and participation in experiences shared with the general population, including education.

Current inclusive stands may be traced to the philosophical ideal of normalization espoused by Wolfensberger (1972) and American society's battle to end segregation (Johnson, 1976; Podemski, Marsh, Smith, & Price, 1995; Rothstein, 1995). This move toward greater inclusion is reflected in legal decisions (Brown v. the Board of Education of Topeka, 1954; Pennsylvania Association of Retarded Children (PARC) v. Pennsylvania, 1971; Mills v. Board of Education, 1972) and legislation such as The Education for All Handicapped Children Act (P.L. 94-142) and The Individuals with Disabilities Education Act (IDEA) and its amendments (1990, 1997). Despite legislated requirements for a free, appropriate public education (FAPE) in the least restrictive environment (LRE), legal questions remain of *what* services qualify as an appropriate education, *how* to balance academic and social goals, and *how* to accomplish selected goals in a environment that is least restrictive remain (Goldman, 1994; Osborne, 1992; Yell, 1995). The over-identification for special education services of students from ethnically diverse or economically disadvantaged backgrounds further suggests the role social and economic factors play in placement decisions (Dunn, 1968; Yates & Ortiz, 1995).

Wiederholt (1989) listed rational beliefs among the forces that shape placement decisions and noted that such beliefs should be shaped by the prevailing knowledge. It is at this juncture, however, that even greater debate exists as research findings further confound the ability of educators to adopt policies and practices that preserve both appropriateness and LRE (Crockett, 1997). Thus, studies investigating the impact of

various delivery options on the cognitive, affective, and behavioral progress of students have questioned the effectiveness of both pullout and inclusive programming (Carlberg & Kavale, 1980; Wang & Baker, 1986; Ysseldyke, Thurlow, Christenson, & Weiss, 1987; Zigmond et al., 1995). The limited number and technical adequacy of these studies fail to provide conclusive directions for programming and placement decisions (Boudah, Schumacher, & Deshler, 1997; Crockett, 1997).

"Mainstreaming," the "Regular Education Initiative (REI)," and, most recently, "inclusion," reflect efforts of educators to operationalize the legislative requirements of FAPE and LRE within the context of multiple societal, legislative, philosophical, and empirical pendulum forces. Mainstreaming resulted from questions of the efficacy of segregated programs for students with mental retardation (Dunn, 1968) and led to including students in general education classes in which the student held prerequisite skills. REI resulted from concerns about increasing numbers of students being served in special education and the associated costs (Will, 1986) and led to a questioning of the efficacy of general education in meeting student needs as well as a questioning of the effectiveness of special education. The issues argued in the 1960s continued through the 1990s and to the present as calls for inclusiveness urge educators to integrate most students with disabilities in general education classrooms (Giangreco, Dennis, Cloninger, Edelman, & Schattman, 1994; Idol, 1997).

For students with LD, the tension that surrounds calls for inclusion is highly visible in the professional literature. Among the least supportive statements regarding inclusion and strongest endorsement of a continuum of service delivery options are the position statements from organizations advocating specifically for students with learning

disabilities (e.g., Council for Learning Disabilities [CLD], 1993; Division for Learning Disabilities [DLD], 1993; Learning Disabilities Association [LDA], 1993; National Joint Committee on Learning Disabilities [NJCLD], 1993). The movement from exclusion to separate, self-contained classes in public schools, and from part-time participation in general education classes with special education resource room support to a greater emphasis on support within general education is perceived by many as progress toward more normal school experiences for students who were excluded prior to federal legislation. For students with LD, many of whom participated without support or success in general education classrooms prior to legislation, the emphasis on general education classes takes on a different timbre and is embraced more tentatively (Vaughn & Schumm, 1995).

Opposition to inclusion voiced by LD organizations is due, in part, to concern that general education classes have not changed enough to support successful learning for students with LD (Baker & Zigmond, 1995; Fuchs & Fuchs, 1995; Vaughn & Schumm, 1995; Zigmond & Baker, 1990). Some argue that general education classrooms may not meet the definition of appropriateness and, therefore, may not be the least restrictive environment for some students (O'Neil, 1995). Determining whether these classrooms are providing curricula (the *what*) that address the needs of students with LD and implementing those curricula using effective methods (the *how*) is a challenge for educators who must ensure appropriateness of services for students as well as providing those services in the least restrictive setting (the *where*) (Pugach & Warger, 1993; Sapon-Shevin, 1995). The term "responsible inclusion" (Vaughn & Schumm, 1995) attempts to

address the critical school and classroom components that must be developed if students with disabilities are to receive an appropriate education in general education settings.

With the current focus on providing special education services within general education, the context under consideration broadens significantly. New questions of efficacy must address the potential for initiatives not only to meet the goals of students receiving special education and to comply with mandated legislation, but also to support the evolving goals for typical learners in general education. While the special education community has struggled with FAPE and LRE, those in general education also have witnessed reform initiatives as educators face a public dissatisfied with the results produced by today's schools (McDonnell, McLaughlin, & Morison, 1997). Greater student and community diversity, challenges of worldwide competition, and comparisons with the academic achievement of students in other nations have prompted school reform at the local, state, and federal level. Approaches have included site-based management, block scheduling, teacher empowerment, family and community empowerment and involvement, and increased academic expectations and accountability (Malloy & Lillie, 1997; Shields & Knapp, 1997; Shields, Knapp, & Wechsler, 1995).

For inclusion to be successful, it must provide appropriate education for students with disabilities *and* support the goals espoused in general education reform efforts (Baker, Wang, & Walberg, 1995; Crockett, 1997). The current wave of standards-based reform calls for high expectations for all students leading to increased achievement for which educators are held accountable. The goal of improved outcomes is also consistent with the philosophy of inclusion (Idol, 1997; King-Sears, 1997; Vaughn & Schumm, 1995). Since many students with LD are expected to master the general education

curriculum, the academic outcomes found in standards-based reform initiatives should provide a congruent goal. How to successfully reach such goals for all students in the general education classroom, however, remains unanswered.

Statement of the Problem

One support structure for providing services to students with LD in general education classrooms is collaborative teaching or co-teaching (Bauwens, Hourcade, & Friend, 1989). This model suggests that many students with disabilities are capable of mastering general education curriculum if classroom structures are altered to provide a wider range of teaching and learning experiences to meet specific student needs (Bauwens & Hourcade, 1991, 1995; Cook & Friend, 1995; Walther-Thomas, Korinek, McLaughlin, & Williams, 2000; Zigmond & Baker, 1990). This emphasis on the general education class makes co-teaching an appropriate model to study within the context of the move toward greater inclusion in special education and standards-based reform in general education. Specifically, how effective is this service delivery model in meeting the needs of students with learning disabilities and their typical peers? How does it compare with more traditional models, such as resource room pullout in which students with LD receive special education services outside the general education classroom?

Student outcomes that receive the greatest focus have the potential to influence classroom processes, school culture and climate, leadership style, and policies and procedures at all levels. Currently, a student outcome that receives such emphasis in Virginia is student performance on the Standards of Learning Tests (SOL Tests). Results of these assessments affect graduation and school accreditation (Finley & Harris, 1997). Decisions about instructional arrangements, service delivery options, and future policies

will be shaped through analysis of this performance, including decisions about students with disabilities. Limited research in both standards-based reform efforts and inclusive practices currently hinders informed decision making (McDonnell et al., 1997). Virginia educators who support more inclusive practices have shared, in informal conversations, that they are being challenged by administrators and policy-makers to demonstrate that practices such as co-teaching will lead to improved student performance on SOL tests as justification for supporting and investing in such programs. The lack of such data prevents or slows adoption of inclusive practices, even when a philosophical belief in its "rightness" can be argued. Also, the lack of such data impedes our ability to refine practices to better align with changing expectations for students and teachers. Therefore, additional information must be collected to facilitate the creation of effective policies and programs for all students (Elliott, Ysseldyke, Thurlow, & Erickson, 1998).

Purpose of the Study

This study compared the achievement of students with and without disabilities, instructional practices employed, and teacher perceptions of service delivery model efficacy in third- and fifth-grade co-taught classes, resource room pullout classes, and general education classes from which students with LD are removed to receive services.

Shavelson (1988) and Oakes (1989) argue that monitoring efficacy has been defined too narrowly in the past and requires "a system of indicators" related to outcomes. Indicators should include assessments of school context as well as student outcomes with the possibility of disaggregation of data (Oakes, 1989). While student performance on standardized tests is receiving much attention at this time, a study of co-teaching and standards-based reform should not use this performance as the sole indicator

of success. School and classroom context, instructional practices, and the impact on different groups of students also should be considered.

Since setting alone may have only an indirect influence on student achievement (Leinhardt & Pallay, 1982), what actually occurs in a co-taught class should be qualitatively and quantitatively different from events in a classroom with one teacher in order to be justified. Weick (1976) suggested that loose coupling provides teachers a high level of autonomy in individual classrooms; therefore, co-teaching does not guarantee that change will occur. As with any reform, change may produce a simple reallocation of resources or a restructuring of those resources (Cuban, 1988, 1990; McLaughlin, 1990). How co-teaching is actually implemented may perpetuate the status quo or embrace changes considered necessary to increase student achievement. If instructional practices have not changed, a major concern voiced by LD organizations and researchers, the issue may be one of poor implementation rather than failure of the model or resources available. Therefore, in addition to achievement outcomes, this study sampled whether or not teachers in co-teaching arrangements employ different instructional approaches in varying frequencies from those employed in general education classrooms without co-teaching or in traditional special education resource rooms.

A third question addressed in this study was teacher perceptions of program efficacy. Previous research on teacher efficacy suggested that the teacher's belief not only in self, but also in teaching as a profession, influenced student achievement (Ashton & Webb, 1986). Believing that one has the necessary teaching skills and that teaching has a strong impact on student outcomes leads the teacher to continue to refine his skills and to view less than successful student outcomes as an opportunity to problem solve and

develop new strategies rather than accepting weak student performance as an inevitable outcome due to factors external to one's teaching. Extrapolating from this, strong positive perceptions of program efficacy would suggest that teachers are invested in the way in which they deliver services to students, believe that the model supports students, and, therefore, work to improve and refine their service delivery. In addition, questions included in the efficacy section of the survey addressed student outcomes beyond performance on standardized tests, providing additional indicators as recommended by Shavelson (1988) and Oakes (1989).

Rationale

Calls for inclusive services, concerns about the readiness of general education to accept and support students with disabilities, and school reform efforts confront today's educators and policy-makers. Research on the impact of inclusive programming and other reform efforts has been limited (Boudah et al., 1997; Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998; McDonnell et al., 1997). In addition, because educational research is not timeless but time- and context-bound (Shavelson, 1988), the lack of clear descriptions of programs in research and the changing service delivery approaches and methodologies make comparisons of existing studies across time difficult, if not impossible. An additional concern has been the lack of valid and reliable measurement tools to assess student progress. Psychometric tests, intended to discriminate among students and diagnose difficulties with alignment to the curriculum being taught, may be invalid when used as measures of academic growth (Marston, 1988; Quenemoen, Lehr, Thurlow, & Massanari, 2001).

Special education legislation has moved the definition of LRE in the direction of general education and general education policy. Higher academic achievement is being mandated for all students with accountability reflected in various forms of sanctions, such as public comparisons of scores, personnel evaluation tied to student performance, and loss of accreditation due to unsatisfactory performance (Eisner, 1995; McDonnell et al., 1997; Noddings, 1997). The performance impact of co-teaching or pullout special education programs for all students on high stakes assessment has become a critical question when schools and teachers are held accountable (Shanker, 1995; Staub & Peck, 1995). Within the context of this study, this has led to such questions as, Are students with LD making adequate progress in either model? Does co-teaching enrich or hinder the performance of students without disabilities in the class?

The call for disaggregation of data by ability, type of disability, or other demographic characteristics (Fuchs & Fuchs, 1995; Klingner et al., 1998; Oakes, 1989) supports analyzing different groups within the classroom to determine effects. Qualitative information from stakeholders of co-teaching such as teachers, administrators, students, and parents (Gerber, 1996; Gerber & Popp, 1999; Gerber & Popp, 2000a; Walther-Thomas, 1997) suggests adjustments made for students with learning disabilities can be beneficial to all students, especially those who have experienced difficulty. A counter concern is that meeting the needs of students with disabilities leads to a watered-down, slower-paced curriculum (Gerber, 1996; Klingner et al., 1998). An empirical study of student performance desegregated for students with and without learning disabilities would begin to address these questions. In addition, use of the SOL Tests aligned with

curriculum strengthens the validity of what is being measured and resolved the concern regarding the use of psychometric tests in studies of academic achievement.

Research Questions

To explore differences in teachers' perceptions of model efficacy, use of instructional practices, and student achievement across service delivery settings and to explore possible variations of the effect on students with varying academic skill levels, the following research questions were proposed.

1. What instructional arrangements are employed, and how frequently, by third- and fifth-grade teachers in co-taught general education classrooms, general education without co-teaching, and pullout special education resource rooms?
2. What are teacher perceptions of the efficacy of the models they use to provide instruction, including what do teachers perceive as the greatest strengths of their current model and what changes would they make to improve the model?
3. Do teachers perceive differential impact of the model in use on groups of students with and without LD in their classrooms?
4. What percentage of all students with learning disabilities in the selected classrooms is: (a) exempt from standardized testing; (b) tested with modification; and (c) tested using standard administration?

The following questions were treated as null hypotheses in Chapter 3:

5. Are there differential outcomes in student achievement as reflected in pass rates and scaled scores on the third- and fifth-grade SOL Tests for students labeled learning disabled, below-average, average, or above-average that correlate with the models of special education service delivery in use?

6. How does student performance on prior achievement assessments correlate with the same students' performance on the Virginia SOL Tests? Does the correlation of student performance on prior achievement tests with these same students' performance on the Virginia SOL Tests vary by subgroup of students?

Definition of Terms

The following definitions provide a foundation for understanding the perspective and interpretation that was applied in the study.

Co-Teaching or Collaborative Teaching

Co-teaching or collaborative teaching refers to "an educational approach in which general and special educators work in a coactive and coordinated fashion to jointly teach academically and behaviorally heterogeneous groups of students in educationally integrated settings" (Bauwens et al., 1989, p. 18). Evidence of a co-teaching relationship includes joint planning, delivery of instruction in the same physical space (Cook & Friend, 1995), and shared responsibility for evaluation of students. Within this study, co-teachers were selected who taught together for a minimum of 50 minutes and a maximum of 120 minutes per day. There was a preference for teaching partners who had co-taught at least two years and had co-taught with each other at least one year.

Efficacy

The Webster dictionary defines efficacy as, "the power to bring about a desired result, effectiveness" (Cayne & Lechner, 1987, p. 299). Building on Albert Bandura's concepts of self-efficacy and teacher efficacy, in particular, this study used the term "program efficacy" to describe teachers' perceptions of the effectiveness of their current service delivery models in meeting the educational needs of their students.

Free Appropriate Public Education (FAPE)

Free appropriate public education refers to the legal principle defined in the IDEA Amendments of 1997 as:

> special education and related services that –
>
> 2. have been provided at public expense, under public supervision and direction, and without charge
> 3. meet the standards of the State educational agency;
> 4. include an appropriate preschool, elementary, or secondary school in the State involved; and
> 5. are provided in conformity with an individualized education program required under 614(d). (IDEA, 1997, § 602)

Inclusion

Inclusion refers to the provision of special education services to students with special needs in general education classrooms in their neighborhood schools among age-appropriate peers without disabilities (Giangreco et al., 1994). "Inclusive schooling is the practice of including everyone–irrespective of talent, disability, socioeconomic background, or cultural origin-in supportive mainstream schools and classrooms where all student needs are met" (Karagiannis, Stainback, & Stainback, 1996, p. 3).

Indicators

Indicators refer to multiple measures of efficacy or lack thereof of educational programs or initiatives (Oakes, 1989; Shavelson, 1988). Examples of indicators addressed in this study include student achievement, instructional time, teacher

qualifications, pupil load or class size, teacher time for planning, and teacher perceptions of student participation in the educational program.

Least Restrictive Environment (LRE)

Least restrictive environment refers to the legal principle cited in the IDEA Amendments of 1997 that:

> To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other case facilities are educated with children who are not disabled, and special classes, separate schooling or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability of a child is such that education in regular classes with the use of supplementary aides and services cannot be achieved satisfactorily. (IDEA, 1997, § 602)

Service Delivery Model

Model refers to "a hypothetical or stylized representation, a generalized description ... used in analyzing or explaining something" (West & Idol, 1987, p. 390). It is a representation of something to be constructed. Service delivery model refers to the generalized description of the manner in which students with disabilities receive their special education services, as defined by an IEP. Examples of service delivery models include consultation, co-teaching, resource rooms, special classrooms, and special schools.

Resource Room

Resource room refers to the delivery of pullout special education services by qualified personnel in a location outside the general education classroom for a portion of the school day. Within this study, students in resource room settings received services to meet IEP goals and objectives in a location outside the general education classroom for less than 50% of the school day.

Standards-Based Reform

Standards-based reform refers to the application of the same high standards (often interpreted as specific content and levels of acceptable performance) to all students and is often tied to assessment and accountability for student mastery of targeted standards (Ravitch, 1995).

Students with Learning Disabilities (LD)

"Students with LD" refers to students identified by the local school division through the eligibility process in compliance with Virginia's and federal definitions of LD. According to Virginia's Special Education Regulations:

> "Specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of

emotional disturbance, or of environmental, cultural, or economic disadvantage. (Virginia Department of Education [VDE], 1994)

Virginia's Standards of Learning

Virginia's Board of Education adopted the current Standards of Learning (SOL), which specify "the academic content and skills that Virginia public school students are expected to learn at each grade level" (VDE, 1998, p. 2). The SOL represent Virginia's version of standards-based reform which includes assessment and accountability for student mastery of targeted standards.

Delimitations of the Study

The Commonwealth of Virginia was the geographic focus of the study. Virginia's revised SOL and the creation of SOL assessments that have consequences for school accreditation as outlined in the 1997 Standards of Accreditation (SOA) were studied along with the impact of co-teaching and resource room programs.

The target population was limited to general and special education teachers and their students in third- and fifth-grade classrooms. These grades were selected because of the existence of statewide assessments at these levels. Students with LD receiving special education support less than 50% of the day and their general education peers were studied. Students with LD with such limited services are more likely to access and succeed within general education curricula. While accommodations and modifications may be needed for these students, such adjustments are more likely to be developed to support reaching general education goals. It is anticipated that students with moderate to severe disabilities are less likely to be included in the standard statewide assessment and

are more likely to be working in an alternative, functional curriculum, which is not the focus of this study.

Two models of special education service delivery were studied: (a) collaborative or co-teaching; and (b) resource room instruction outside the general education classroom and its general education counterpart. Other forms of service delivery, such as consultative services, were not the focus of the study.

Limitations of the Study

This study relied upon data collected from schools and classrooms already in existence. Therefore, traditional experimental expectations of random selection and random assignment cannot be met. Participants (i.e., teachers) were limited to volunteers. This limits generalizability of results. In addition, teacher perceptions of program efficacy and use of instructional arrangements were obtained through a survey dependent upon teacher report.

Summary

This study explored teacher perceptions of efficacy, instructional arrangements employed, and student achievement on standards-based assessments across co-taught general education classrooms, traditional resource room special education classrooms, and general education classrooms without co-teaching for students with learning disabilities and their general education peers.

Questions of effective practices in special education and general education have reached a point of intersection. Calls for appropriate education of students with disabilities in least restrictive environments are found in special education legislation and litigation. The result is a greater reliance upon shaping and supporting general education

programs to meet the needs of students with disabilities. For students with LD, a population that has traditionally experienced failure within the general education classroom, there is concern about the ability of general education classrooms to adequately meet students' needs. As special education relies more heavily upon the general education classroom as a vehicle for service delivery, meeting the demands of standards-based reform with its call for higher expectations, increased achievements, and educational accountability for all students becomes the responsibility of both general and special education.

Co-teaching is a service delivery option employed by educators to provide students with LD support in general education classrooms and to meet the legal requirements of least restrictive environment. Several important questions regarding the efficacy of this model for students with LD exist. These include whether or not general education classrooms can be structured to provide appropriate levels of support for students with LD and how students without disabilities in co-taught classrooms are affected. In an effort to respond to these questions, this study considered standards-based assessments tied to educational accountability, instructional arrangements, and teachers' perceptions of efficacy to provide multiple measures of the effectiveness for all students of co-teaching versus more traditional service delivery (resource room and general education classroom without special education support).

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction to Conceptual Model

The education of individuals with special needs has varied greatly throughout history. Wiederholt (1989) noted the lack of a smooth transition in this process and suggested that while generally moving in the direction of greater integration with mainstream society, the movement has been marked by conflict and controversy. The analogy of the swinging pendulum seems apt in describing the trends in the care and treatment of persons with disabilities. Elements such as "irrational and rational beliefs, social and economic conditions, religion, law, and the prevailing level of knowledge" (Wiederholt, 1989, p.182) have interacted throughout history and led to the options that currently exist. Service options for students with disabilities range from instruction in the general education classroom with consultation or in-class support, part-time pullout resource room, self-contained special education classroom, special day school, through residential placement.

The current move toward more inclusive placements within general education settings for students with a wide array of special needs provides an opportunity to explore the issues of conflict and controversy and the multiple issues that "gather energy" for the pendulum. Both critics and proponents of greater inclusion can be found among educators, parents, and legislators (e.g., Fuchs & Fuchs, 1995; Gerber, 1995; Roach, 1995). The greater involvement of general education has added the voice of general

educators to the debate (e.g., Yatvin, 1995) and the move toward greater interagency collaboration in meeting students' needs has increased further the number of players who may impact a student's education.

As shown in Figure 1 several factors interact and shape service delivery options available within educational systems to meet the needs of individual students. Briefly, philosophies and beliefs regarding the role of the individual in society and the value of both color our views of education and its purpose (Boyer, 1987). Historically, the tensions that exist between the community and the individual have impacted our treatment of individuals who exhibit differences, such as those with physical, learning, and behavioral disabilities. These beliefs influence societal norms that are reflected in the laws we create and the way they are interpreted over time. Scientific inquiry also is shaped by the belief systems of the society (Kuhn, 1996) and its laws. The results of research have the potential for shaping public opinion and providing justification for legal changes.

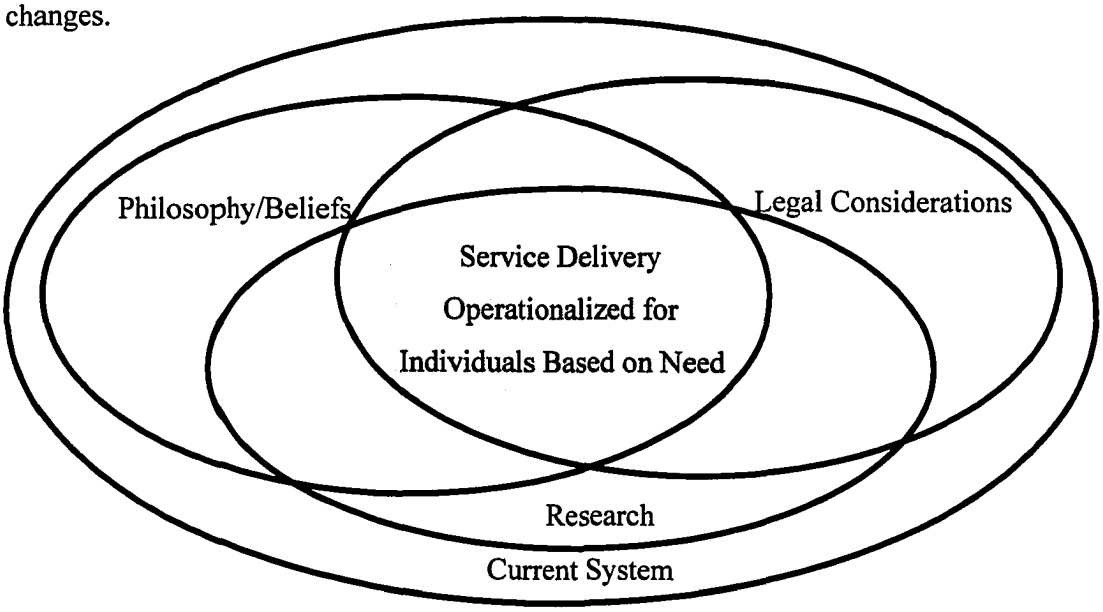

Figure 1. Factors influencing service delivery options and selection.

The center of the model shows that the overlapping of these elements shapes practice and influences the decisions made for individual students. When weak support, confusion, or strong differences of opinion exist within any domain, successful decision making is threatened and controversy becomes more likely. The greater the overlap among the forces, the less challenge one can expect. While individual decisions should be based upon the needs of each student, determining what is best for a student will require the ability to identify the "best fit" between student needs and the system within which services are provided.

The call to provide services to students with disabilities in more inclusive settings broadens the context that must be considered when evaluating the appropriateness and effectiveness of special education programs. Inclusive practices impact not only students with special needs and their special education teachers, but also the larger school community, including general education teachers and typical peers. How inclusive practices align with the workings of the general education program and how such practices impact all members of the class are questions that now must be addressed.

Current System

As special education has evolved in an effort to meet the needs of students with disabilities, general education has witnessed a number of reform efforts as well. Thus, the effective schools and standards-based education movements have influenced the general education context that special education has sought to enter. Briefly, the effective schools literature offers a theoretical basis supported by research that identifies critical elements leading to student achievement, whereas the standards-based reform movement emphasizes one component highlighted by effective schools research -- the need for high,

clearly defined expectations. This focus has shaped additional legislation and policy at federal, state, and local levels. In the following sections, we will take a closer look at both of these movements.

The Effective Schools Movement

Since the 1970s researchers have been committed to identifying and analyzing procedures and practices that stimulate student achievement. Earlier research suggesting that schools were largely powerless to counter the effects of social background made socioeconomic status (SES) appear a greater predictor of academic growth than the efforts of educators (Bickel & Bickel, 1986; Coleman et al., 1966). While much diversity in methods and results existed, the researchers in the effective schools movement shared a unifying belief that school and classroom level variables could influence student achievement. Therefore, by identifying such variables schools could make changes that would increase educational equity for students in poverty (Greenwood, 1991; Greenwood, Delquadri, Stanley, Terry, & Hall, 1986).

Characteristics of effective schools identified by researchers included an emphasis on academics with accountability and frequent monitoring of student progress, high expectations for the performance of all students, a safe and orderly environment, and instructional leadership with a clearly defined school mission shared by school personnel and families (Bickel & Bickel, 1986; Butler & Dickson, 1997; Edmonds, 1982; Shields et al., 1995; Shields, Knapp, & Wechsler, 1995).

Organizational theory has been addressed within this research base with the concept of "culture" receiving much attention. Elements identified with school culture as associated with school effectiveness include collegiality, trust and confidence, tangible

support, appreciation, caring, celebration, humor, and honest, open communication (Butler & Dickson, 1997; Kirby & Blase, 1991). In other words, "Students benefit when teachers share ideas, cooperate in activities, and assist one another's intellectual growth" (United States Department of Education [USDE], 1987). For example, Zahorik (1987) conducted multiple case studies across various SES and organizational arrangements and found that collegial exchange was greater in higher-SES schools. A "major implication of the findings is the need to help teachers become less private about their classroom behaviors as a way to increase collegiality, improve instruction, and make teaching more rewarding" (Zahorik, 1987, p. 385). Teacher exchange was seen as critical to professional development, teacher satisfaction, and teacher retention. This finding was supported by a later studies reporting that teacher trust in colleagues and levels of professional interaction explained schools' effectiveness (Hoy, Tarter, & Witkoskie, 1992; Little, 1982; Rossman, Corbett, & Firestone, 1988).

Further, teacher efficacy appears closely related to the climate and culture elements and high teacher efficacy has been associated with increased student achievement (Ashton & Webb, 1986; Gibson & Dembo, 1984). Efficacy, in general, refers to the belief that the individual can control the environment and shape outcomes (Bandura, 1993; Pajares, 1996). Applying the concept of self-efficacy to the field of teaching has led to the identification of teaching efficacy, the belief that teaching has a direct impact on student growth, and personal teaching efficacy, the belief that individual teachers have about their skills to create that impact (Gibson & Dembo, 1984). For example, low efficacy may lead a teacher to accept the belief that weak students come to class with challenges in their lives that the teacher cannot change and result in reduced

teaching effort since weak performance is expected. Teachers with greater teaching efficacy, on the other hand, may place greater emphasis on their instructional arrangements and teaching strategies when analyzing student performance. Thus, the teacher with high teacher efficacy strives to create an environment that supports increased achievement among all students. A teacher who believes that instruction makes a difference may expend greater effort to reach students because there is a perceived benefit for that effort, (i.e., improved student achievement). Such teachers are likely to benefit most from school climates that nurture teacher collegiality and professional development. Such teachers see a logical connection between their growth as educators and the performance of their students (Oakes, 1989).

Recognizing the limits of top-down reform efforts, a national survey of SEA and LEA programs identified promising school-based reforms. Based on the study of a variety of reform efforts, the researchers concluded that common elements included attainable goals with long time ines, focus on curriculum and instruction with targeted professional development, school-level decision-making structures, and collaborative structures for staff tied to professional development (Shields et al., 1995; Shields & Knapp, 1997).

Many early studies of effective schools focused on basic academic skills. As the definition of effectiveness continued to evolve, researchers and key leaders urged a broadening of the definition to address higher-level thinking and problem-solving skills (Rossman et al., 1988; Shields et al., 1995) and the use of multiple indicators in evaluation (McLaughlin, 1990; Oakes, 1989; Shavelson, 1988). Indicators should "paint a broad picture of the condition of education and stimulate thinking about potentially

effective policies...[by relating] outcomes such as achievement and participation rates to inputs and processes" (Shavelson, 1988, pp. 6-7). These recommendations were being made as a new reform effort was taking shape.

Standard-Based Reform

The standards-based reform efforts emphasize several key elements identified in the work on effective schools, namely, high expectations for all students and frequent assessment tied to accountability measures. Standards in educational reform have become a popular topic in the general media, on the lips of politicians, and throughout the educational literature. Current reports range from fervent support, through cautious skepticism, to adamant rejection. According to some accounts, the word "standard" and its meaning are very recent additions to the education arena (e.g., Marzano & Kendall, 1996). In these accounts, the historical context for standards in education was born following the publication of A Nation at Risk in 1983. Other authors have taken a broader, longer view of the issue arguing that standards have always been woven into education (Eisner, 1995; Lewis, 1995; Ravitch, 1995). Questions of jurisdiction further complicate the issue of educational standards. The appropriate local, state, and federal roles in defining and monitoring standards parallels the tension among these jurisdictions in other educational arenas.

Defining standards. The term "standard" has a number of meanings in everyday speech (Eisner, 1995; Noddings, 1997; Ravitch, 1995). It can refer to a banner, pennant, or flag -- something around which to rally. A standard may be a goal to be reached or a proficiency level. It may be a model or example "established by authority, custom, or general consent" (Ravitch, 1995, p. 9) or an agreed-upon unit of measure (such as

weights and measures). Standard is often associated with a level of high quality. Eisner (1995) reminded us of a slightly different interpretation. We would not consider a standard meal or standard response something of high quality. Therefore, standard can also refer to minimal levels of acceptability.

The current literature further delineates educational standards based upon their focus and purpose. Content standards or curriculum standards refer to what should be taught and learned in school. "A *content standard* should be measurable, so that students can demonstrate their mastery of the skills or knowledge; if mastery of the standard is neither measurable nor demonstrable, then it is probably so vague that it has little meaning or value for teachers and students" (Ravitch, 1995, p. 12). *Performance standards* define criteria for acceptable levels of mastery. "Performance standards describe what kind of performance represents inadequate, acceptable, or outstanding accomplishment" (Ravitch, 1995, pp. 12-13). Finally, *opportunity-to-learn* (OTL) or school delivery standards address the "the availability of programs, staff, and other resources that schools, districts, and states provide so that students are able to meet challenging content and performance standards" (Ravitch, 1995, p. 13).

In addition to varying understandings of what we mean by a standard (how specific, how measurable), another underlying problem has marked the history of education in the United States. We lack consensus about the purpose of education. We disagree about what should be taught in schools, what levels of performance are considered satisfactory, and who is included in the "all students" category when determining opportunities to learn. "The process of scholars and government bodies deciding what children should know, Clinchy says, 'is fraught with great intellectual and

social dangers and burdened with prospect of inevitable and endless controversy'" (Lewis, 1995, p. 749). This lack of consensus plays a significant role in the politicizing of education and the tension that accompanies educational policy-making, especially when national standards are considered (Sabers & Sabers, 1996).

Educational standards at the national level. Several forces that have influenced the emergence and appearance of national standards include economic concerns, practicality (the need for some standardization), and civil rights (Jennings, 1995). While policy-making and organizational frameworks may vary at the state and local levels, the actual curriculum students experience has been found to be very similar (Lewis, 1995; Ravitch, 1995). National content standards are reflected in the similarities that exist in curriculum throughout the country. Similar content is taught at certain grades with very similar materials. The sameness results from common textbooks, nationally standardized assessments, similarities in teacher training, and the requirements for entrance into higher education (Lewis, 1995; Ravitch, 1995). As immigration increased the diversity of our nation in the mid 1800s, schools were called upon to provide a common experience. Educators such as Horace Mann encouraged uniformity of schooling to promote this purpose. Standards for schools included creation of a unified national identity and a trained workforce (Ravitch, 1995).

A major argument against national education standards is based on the lack of a constitutional precedent for national involvement in education. In creating the context for standards, many authors note the federal government's involvement in educational policy following Sputnik in 1957 (Eisner, 1995; Taylor, 1996). The fear that the United States might not be first in math and science led to a call for more stringent requirements.

Federal funding supported the development of new math and science programs that raised the standards, especially for the ablest students.

Additionally, federal legislation was enacted in the 1960s and 1970s to address the needs of the less fortunate. Education's role in addressing the social issues was supported through federal funding of educational programs for the disadvantaged. Opportunity-to-learn standards have a long history of national educational policy. The issue of equal access underlies OTL standards and can be considered a federal responsibility under the equal protections clause of the Fourteenth Amendment. Desegregation initiatives and special education legislation are founded on this constitutional justification.

Shift from procedural to substantive rights can be found in reauthorization of the Improving America's Schools Act (1994) and the Individuals with Disabilities Education Act (1997). This reflects changes in the emphasis of standards. Earlier versions of these laws emphasized procedural rights, which most closely align with OTL standards. The assumption had been that if schools follow the right process and include the right inputs, students would be successful. With recent bills reflecting a greater emphasis on outcomes, these substantive rights are bringing greater attention to content and performance standards for these groups of children.

Beyond the national promotion of ideas through grants and protections for certain classes of students, support for national involvement was very limited through the late 1970s (Lewis, 1995). The most recent calls for standards, resulting from A Nation at Risk, were again sparked by concern about U.S. economic and academic performance in a global market. The message has been that schools are failing students woefully and that

one key to reforming this situation is the adoption of higher standards with an emphasis on outcomes and accountability. Through the Bush administration's America 2000 and the Clinton administration's subsequent variation, Goals 2000, which became law in 1994, the emphasis has been on voluntary participation with the federal government playing the role of supporting local and state initiatives in developing higher standards for students.

Goals 2000 has suffered many criticisms. Frequently cited concerns include the following: (a) while the law calls for voluntary participation, implementation will lead to federal mandates over educational issues (Marshall, 1995); (b) assessments and accountability measures may further differentiate the "haves and have nots," creating another barrier for disadvantaged students rather them helping them achieve more (Weinstein, 1996); (c) educational researchers were not part of the dialogue in summits related to this initiative (Good, 1996); (d) there was a heavy emphasis on business involvement in defining standards, yet some researchers suggest business holds some responsibility for the current deficits in education and social issues that impact achievement (Good, 1996); (e) uncertainty that standards can be truly challenging for all students and yet provide some level of standardization are left unanswered (Cohen, 1995); (f) accountability tied to standards may limit the educational experience as teaching becomes tied to a test; and (g) political rhetoric misses the detail work of actually establishing the standards. Who has a voice in determining standards is unclear. It is even less clear if those with a voice have the ability to reach consensus in a timely fashion that can impact students currently in school (Consortium for Policy Research in Education, 1993).

Promoting school reform in the form of greater rigor to improve educational gains did not begin in 1983 with A Nation at Risk. Whether the word "standard" was used or not, school reform has long sought to shape the content of what is taught, the level of performance that is acceptable, and who will benefit from what type of education. National standards have often developed through tacit acceptance of the status quo. Tradition, the big business of publishing and testing, and the demands of the public have shaped educational standards. The federal government's role in these reform efforts has been influenced by changes in the economy, how we perceive our international standing and the roles assigned to our schools. Today, our economy changes so rapidly that predicting needs for the future has become more challenging. The diversity of people and opinions regarding what should be taught in schools has led to heated debate. While some advocate new changes in the content of the curriculum, others call for a return to traditional basics. One man's reform may be seen as another man's retreat.

Content, performance, and opportunity-to-learn standards can be defined very specifically or very broadly. Too much specificity would lead to unmanageable quantities, while fewer broad standards could become too vague to measure. The challenge to balance flexibility and specificity is a critical component in building consensus for standards. The call for national standards has increased the dialogue around what schools should be like, but the lack of consensus will make sweeping changes less probable and incremental change more likely. Calls for reform echo the following 33-year-old quote. Whether current interpretations of standards and the way they are implemented will make such a quote obsolete 30 years from now is a valid question.

> There can be no doubt that many of our public schools have failed to challenge the intellectual ambitions of many able pupils; many of our high schools have not offered the opportunities for study which are essential for the development of scientific and scholarly talent. The situation has improved over the last ten years, but there are still demands for profound and far-reaching changes in both our public schools and our colleges. (Conant, 1964, p. 3)

The evolution of services for students with disabilities has taken place within the same broad context and reforms in the general education arena. The following sections will explore developments in special education and conclude with a review of parallels that exist at the intersection of standards-based reform and inclusion.

Philosophy and Beliefs

The belief systems and modes of living within our society have influenced delivery of services to individuals with disabilities. Survival, superstition, religious teachings, science, service, politics, and economics are among the motives that have caused the pendulum to swing from infanticide and exile through institutionalization and treatment (Jarvis, 1971; Melcher, 1976; Wiederholt, 1989); and from attempts to normalize interactions with the general public (Wolfensberger, 1972) to even greater acceptance and inclusion of individuals with disabilities (Stainback & Stainback, 1995).

The increased awareness of children with disabilities and social milieu that occurred from the 1940s through the 1960s provided fertile soil for the introduction of legislative involvement in special education. Initially, legal assurances led to providing children who previously had been denied any access with educational services and lessening the reliance on institutional settings through the provision of day programs

within general education schools. While children with special needs were more likely to receive educational services, such services often were provided through a parallel system of education (Pugach & Warger, 1993).

Underlying the shift toward greater integration into general education in the 1980s and 1990s in the form of mainstreaming, the regular education initiative (Will, 1986), and inclusion (Stainback & Stainback, 1990) is a belief in equality of opportunity. This belief has shaped and been shaped by legal decisions and research findings which will be explored in the following sections.

Legal Foundations

In the 1970s, a growing awareness developed that children with disabilities were not receiving appropriate, and in many instances, any educational opportunities. One million children with disabilities were totally excluded from public schools and approximately three million were not receiving appropriate programming (IDEA, 1997; Rothstein, 1995). In 1975, Congress passed the Education for All Handicapped Children Act (EHA or P.L. 94-142), reauthorized as the Individuals with Disabilities Education Act (IDEA) in 1990 and subsequently amended in June 1997. Its purposes have been to ensure that children with disabilities receive an appropriate education and that their rights are protected; to assist states and local education agencies in meeting the needs of these children through financial support; and to assess the effectiveness of efforts to educate children with disabilities (IDEA, 1997; USDE, 1995).

Service delivery options for students with special needs have continued to evolve since 1975, as have the interpretations of IDEA's requirements for a free appropriate public education (FAPE) in the least restrictive environment (LRE). With the 1997

reauthorization of IDEA, how appropriate services and LRE are defined by theorists and legislators and operationalized by practitioners and litigators moved from simple access and "some educational benefit" (Hendrick Hudson Central School District v. Rowley, 1982) to assurances for participation in the general education curriculum documented by accountability measures.

FAPE and LRE as Legislated

The IDEAs provision for a free appropriate public education in the least restrictive environment has generated much discourse among educators and litigation between parents and school districts. *What* is deemed "appropriate" or "least restrictive" has not been static (Osborne & DiMattia, 1994). Early on, determining appropriateness focused on ensuring the procedural rights of students with disabilities and their parents. In today's educational climate stressing accountability (Hehir, 1996; Osborne & DiMattia, 1994; Pipho, 1997; Sage & Burrello, 1994; Yell & Shriner, 1996) and evolving educational theories regarding service delivery models, there is a move toward greater emphasis on substantive rights (Weintraub, 1997). Possible conflicts between *appropriate* and *least restrictive* have become more intensely contested, leaving the courts to provide direction.

Providing clear definitions of a free appropriate public education (FAPE) and the least restrictive environment (LRE) that can adequately guide educators in making placement decisions is a formidable task. IDEA describes the key components of free appropriate public education and least restrictive environment and these definitions were included in Chapter 1. Yell (1995) suggested that while laws and regulations appear unambiguous, it is often difficult to apply legal principles to educational theories and

practices. Definitions of what is "free," "public" and "education" have been argued in the courts. Similarly, what is considered "appropriate" has been the basis for much discussion and disagreement regarding service delivery options.

"Appropriate" has often been determined by considering LRE. Least restrictive environment can be viewed as *one element* required to ensure "appropriateness" within FAPE as illustrated in Figure 2. Logically, an appropriate education is one in which the student receives his or her education *in* the least restrictive environment. "The two principles are inextricably entwined" (Turnbull & Fiedler, 1984, p. 11). "The tension results when parents or educators must choose between (1) specialized services and some degree of separate treatment and (2) minimized labeling and minimized segregation" (Goldman, 1994, p. 262). While FAPE has traditionally focused on procedural rights, LRE has evolved to reflect a greater emphasis on substantive rights (Weintraub, 1997). The number of students with disabilities in general education classrooms and the amount of time spent there can be quantified and reported.

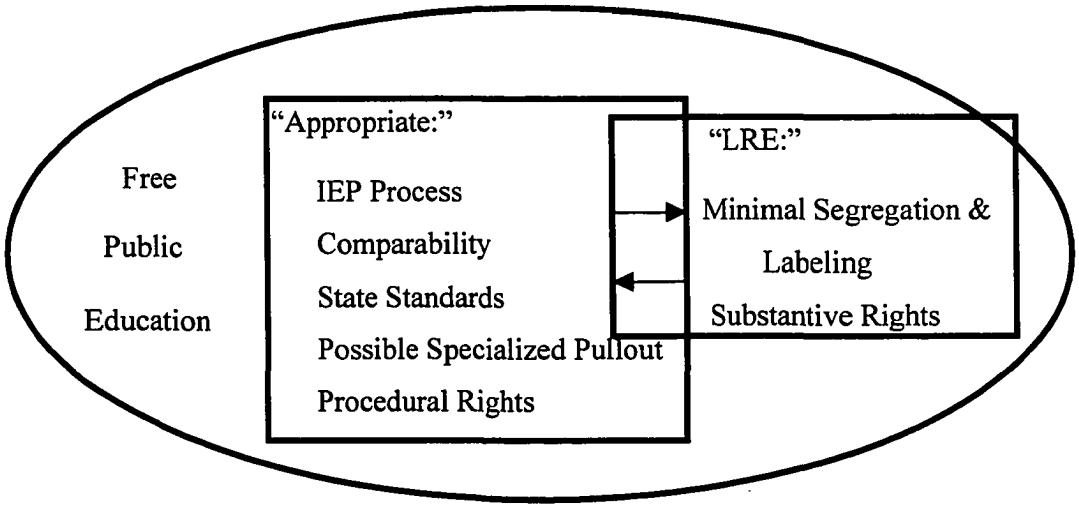

Figure 2. The possible tension between "appropriate" and "least restrictive."

It is interesting to note that the IDEA (1990) called for a "continuum of alternative placements" (§ 300.551), with determination made at least annually, based on the IEP; education within the neighborhood school, unless other arrangements are required; and consideration "to any potential harmful effect on the child or the quality of services" needed when determining the least restrictive environment (§ 300.552). This language no longer exists in the 1997 amended act. The word "continuum" is absent from the document as is "potential harmful effect." While the law originally focused on process, the public has become increasingly more critical of the education system, in general, with calls for greater outcome accountability. Thus, an appropriate, individualized education in the least restrictive environment is now considered to comprise major substantive principles in the IDEA (Rothstein, 1995; Weintraub, 1997).

FAPE and LRE as Litigated

Interpreting what is least restrictive has been left for case law when parents and schools fail to reach agreement (McKinney & Mead, 1996). A review of cases and their analyses quickly reveals a lack of consensus regarding least restrictive environment. In many cases, parents sought less restrictive environments for their children. Cases in which parents sought more restrictive placements have occurred as well. Cases resolved at the appellate court level have established a number of standards to aid in making decisions regarding placements (Daniel R. R. v. State Board of Education, 1989; Roland M. v. Concord School Committee, 1990; Roncker v. Walter, 1983) and have broadened the responsibility of school districts to attempt the use of supplementary supports and services in the general education when determining placements (Oberti v. Board of Education, 1993; Sacramento City Unified School District v. Rachel Holland, 1994).

Despite the court-developed standards, issues regarding what constitutes appropriate supplementary supports and modifications and an operational definition of benefits derived continue to bring litigation in which service delivery options are questioned on the basis of LRE. The existence of different interpretations and standards when courts take on the role of determining LRE has led some to advocate for a Supreme Court ruling to "resolve the inconsistency surrounding least restrictive environment," (Goldman, 1994, p. 291). Others interpret the rulings as being essentially in agreement and see no reason for Supreme Court involvement (Yell, 1995). It seems that LRE is an issue for which one can even find inconsistency in determining whether inconsistency exists!

Table 1 provides a summary of recent court rulings and factors that shaped decision making. Procedural compliance by the schools, school and parent preferences, safety issues, social benefit, and student age have been considerations the courts highlighted when supporting more restrictive and less restrictive placements.

Table 1

Recent Trends in Court Rulings on LRE

Support for More Inclusive Programs If:	Support for More Segregated Programs If:
Parent preference & procedural errors School preference and procedural compliance	School preference and procedural compliance
Social benefit	Lack of benefit from modeling peers
Reasonable teacher time	Disruptive/dangerous behavior
Elementary school age	Secondary school age

The views represented in court decisions reflect various philosophical perspectives regarding the rights of the individual and the community, the need for normalization, the importance of remediation, and the search for ideal standards within the realities of limited resources. The legal mandate of LRE evolved from social pressure. Applying the conceptual model proposed in this chapter, the fourth component for consideration is research. Schools were left to create least restrictive environments with limited data to direct effective practice. How educators have operationalized the legal mandates of appropriate education and least restrictive environment and the challenges of interpreting research to make more informed decisions for students will be addressed in the next section.

The Evolution of Least Restrictive Environment in Theory, Practice, and Research

FAPE and LRE reflect legal principles. To be meaningful, they must be translated into educational practice and applied to individual children. Osborne (1995) noted changing definitions of LRE in court interpretations, citing two key explanations for this change: (a) the evolution of educational theory and (b) the influence of parents seeking normalcy for their children. The terms "mainstreaming", the "Regular Education Initiative" (REI), and "inclusion" reflect the evolution of educational theory related to FAPE in the LRE. The development of service delivery models is an educational effort to operationalize LRE.

An Early Challenge

> In the early days, these children [students with mild learning problems] were simply excluded from school. Then, as Hollingworth (1923) pointed out, with the advent of compulsory attendance laws, the schools and these children "were

> forced into a reluctant mutual recognition of each." This resulted in the establishment of self-contained special schools and classes as a method of transferring these 'misfits' out of the regular grades. (Dunn, 1968, p. 5)

After working in the field of special education for 20 years, Dunn (1968) challenged the prevalent system of separate schools and classes for student with mild disabilities, suggesting the creation of such programs was a form of tracking already being challenged as unconstitutional by the courts. Dunn further observed the high incidence of disadvantaged students placed in special education and questioned the equity of a system that seemed geared toward children from racially and ethnically diverse and financially disadvantaged backgrounds, a question repeated in the early literature of general education's effective schools movement.

Dunn cited research from the 1960s which suggested that homogeneous groups of slow learners were at a disadvantage compared to peers of similar ability who remained in heterogeneous groups and efficacy studies which indicated students with mental retardation did as well or better in general education classes as in segregated special education classes. Dunn raised questions regarding the processes followed for identification of students for special education and sounded a call startling familiar today:

> No longer is the choice just between a self-contained special class and a self-contained regular elementary classroom. Although the impact of the American Revolution in Education is just beginning to be felt and is still more an ideal than a reality, special education should begin moving now to fit into a changing general education program and to assist in achieving the program's goals. (Dunn, 1968, p. 10)

According to Dunn, special educators should continue to provide primary support for students with severe disabilities and serve as "resource teachers in devising effective prescription and in tutoring" (p. 11) for students with less severe disabilities, while general education retained primary responsibility. Directing his comments primarily to students with mild retardation, especially those from nonmiddle-class communities, Dunn acknowledged the applicability of his remarks to students who would now be identified as having a learning disability. In addition, the criteria for identifying students as mentally retarded at that time would have included some students now considered LD. Since Dunn's early challenge, movement away from separate schools and classes has been pursued in a variety of incarnations , as noted below.

Mainstreaming

"Mainstreaming" was an early term used to describe students with special needs being educated in general education classrooms. The model for mainstreaming typically emphasized that students demonstrate a "readiness level" that would allow them to participate in the general education classroom (Falvey, Givner, & Kimm, 1995). Mainstreaming emphasized students' readiness for general education classes, NOT classes geared to meet special needs. In the mainstreaming model, special education support was not provided in the general education class, but some reinforcement from special education might occur in the special education classroom.

In an effort to provide more general education experiences, the resource room model provided students with special needs "pullout" instruction for smaller portions of the day, often ranging from 30 minutes to an hour, to remediate specific weaknesses while students participated in the general education curriculum in other areas. Critics of

the resource room who argued for the continuation of self-contained classrooms for students with learning disabilities believed "that a 30-minute or so pullout program for the remediation of basic skills was a 'total waste of time ... a minimum of two hours time, time for a *total* reading program, is necessary' (Daniels, 1981)" (Chandler, 1981, p. 547). The debate between appropriate and least restrictive was accelerating.

The Regular Education Initiative

Due to the number of students unable to meet with success in the mainstreaming model, a gradual shift occurred to bring supports and services *into* the general education classroom. This change is reflected in the expanded definition of "supplementary aids and services" in the IDEA to include "aids, services, and other supports that are provided in regular education classes" (IDEA, 1997 § 602.28). In 1986, the United States Department of Education Office of Special Education and Rehabilitative Services (OSERS) issued the Regular Education Initiative (REI) (Will, 1986). REI resulted from concerns about increasing numbers of students being served in special education and the associated costs. This initiative questioned the lack of assumed responsibility for students with disabilities by general education as well as the effectiveness of special education. The purpose of REI was to create ways for students receiving special education to access the support they needed within the general education classroom. This goal would require special education programs to develop a partnership with general education.

While some special educators supported REI, it was not very well received by a variety of educators in both general and special education. This weak reception has been attributed to the perception that special education was telling general education how to

conduct business and that it was a top-down directive initiated during a time of budget reductions, and therefore a way to cut costs (Stainback & Stainback, 1995, 1996).

The Shift Toward Inclusive Education

Results of the National Longitudinal Transition Study (Wagner, 1989) have been used to show the failure of special education to meet its objective of preparing individuals with disabilities to function successfully as adults. High percentages of dropouts, unemployment, and underemployment have been cited. Such data, along with the impetus provided by REI, led to a greater focus upon mainstreaming, which evolved into the concept of inclusion.

Consensus does not exist regarding a definition for inclusion. While some emphasize the provision of support in the general education classroom along a continuum based on student needs that may require some pullout services, proponents of full inclusion stress "including everyone – irrespective of talent, disability, socioeconomic background, or cultural origin – in supportive mainstream schools and classrooms where all student needs are met" (Karagiannis et al., 1996, p. 3). This suggests a unified system of education with the complete merging of general and special education (Giangreco et al., 1994; Skrtic, 1995). Proponents of "full inclusion" see inclusion as a means of meeting the needs of all students within the same educational system and argue that "full inclusion" is redundant since "inclusion" refers to all students (Idol, 1997). Inclusive programs establish and maintain warm, accepting classroom communities that embrace diversity and honor differences; implement multilevel, multimodality curriculum; and prepare and support teachers to teach interactively (Sapon-Shevin, 1995).

The term "responsible inclusion" attempts to address the critical school and classroom components that must be developed if students with disabilities are to receive an appropriate education in general education settings. By putting the student first, decisions are made to choose inclusive participation based on the provision of adequate resources, maintaining a continuum of services, and continually evaluating and altering service delivery and curricular approaches to meet all students' needs (Vaughn & Schumm, 1995).

> Responsible inclusion may be the best model for eliminating the debate [for full merging of general and special education or conservation of special education] because it addresses the individual needs of students, within the context of permeable boundaries between general and special education . . . First, all students, not just special education students, benefit from most inclusionary practices. Secondly, the continuum of special education administrative arrangements, i.e., consultation, resource rooms and self-contained classes provide immeasurable assistance with individualized strategies for integrating regular and special education. (Malloy & Lillie, 1997, p. 10)

The following quote captures the affective, belief-driven thrust of many inclusive practices.

> I look at the word inclusion and I just think of what it says -- that a child can be included in the real workings of the day at school -- that they're not separate and apart. They feel as much a piece of the fabric of the school as anyone else. When they walk in the front doors, they feel they belong and that, "This is my place

today as much as anybody else's and I've got as much love and attention as anyone else is going to get. (Anonymous administrator during interview, 1997)

Responding to REI, which suggested general educators have greater responsibility for students with disabilities, and changes in federal legislation, which expanded the meaning of supplementary aids and materials to include what occurs in the general education classroom, many approaches to inclusion involve some form of collaboration (Boudah et al., 1997). Some rely on a triadic relationship in which special education support is provided through a problem-solving structure in a consultative relationship and students' needs are addressed indirectly by supporting the general education teacher. Later approaches included direct support within the general education classroom, such as co-teaching.

Operationalizing LRE in Practice

Through the era of mainstreaming, no special strategies were required of general or special educators in supporting the student with LD in the general education classroom. As previously noted, the student was mainstreamed because she met the prerequisite skills needed for success in the class. REI and the move toward inclusive approaches necessitated the development of strategies to provide support in general education for students with disabilities. An early approach was adapted from the expert consultation model used in counseling and medicine. That is, special educators were trained to take on the role of consulting teachers (Knight, Meyers, Paolucci-Whitcomb, Hasazi, & Nevin, 1981), who could provide technical assistance to general educators who maintained responsibility for students with disabilities within the general education program. Teacher assistance teams (Chalfant & Pysh, 1989) offered another alternative

by building on a problem-solving process that recognized the expertise that exists within a school and the importance of teachers being empowered to choose interventions that seem reasonable to them to increase successful implementation. Recognizing the possible disconnect when the special educator was placed in the role of expert and potential lack of shared responsibility, collaborative consultation (Idol, Nevin, & Paolucci-Whitcomb, 1994; Johnson & Pugach, 1996) emerged as yet another problem-solving structure. Collaborative consultation emphasized the expertise that each party brings to the process and the need for parity among the roles when developing strategies to support students with disabilities in general education classrooms.

An alternative to such indirect service requires the general education and special education teacher to team in the planning and delivery of instruction to all students within a general education classroom setting. Collaborative teaching or co-teaching (Bauwens, & Hourcade, 1991, 1995; Bauwens et al., 1989; Friend, Reising, & Cook, 1993) was proposed as a model to meet the calls for greater inclusion of students with disabilities within the general education curriculum. This model suggests that many students with disabilities, including students with LD, are capable of mastering general education curriculum if classroom structures are altered to provide a wider range of teaching and learning experiences to meet specific student needs (Bauwens & Hourcade, 1991, 1995; Cook & Friend, 1995; Walther-Thomas et al., 2000; Zigmond & Baker, 1990).

Although the literature contains an extensive discussion of legal issues, philosophy, and technical suggestions for practitioners, disagreement about the effectiveness of various service delivery models persists. The following section will explore the empirical evidence that exists in that regard.

Efficacy of Service Delivery Models as Studied by Researchers

Research in the fields of medicine, psychology, and education forms the foundation of understanding and knowledge regarding individuals with disabilities in terms of etiology, what to teach, and how it should be taught. Educational research has a tradition of poor transfer of findings into classroom practice and,therefore, has been targeted as a critical area for reform (Clifford & Guthrie, 1988; Goodlad, 1990). One reason is that valuable research is not translated into forms that are accessible and meet the needs at the school level. In addition, researchers often do not pursue questions viewed as most urgent by practitioners. A third factor is the complexity of interacting variables in educational settings. Clinical settings allow greater control and application of the scientific method; however, practitioners fail to see its applicability to natural settings. A fourth factor, one that is highly evident in the review of special education service delivery research, is the lack of statistically significant results and even conflicting results among studies.

Research Findings for Self-Contained, Resource Room, and Mainstreamed Settings

Self-contained classrooms, resource rooms, and mainstreaming were the most frequently used educational settings through the late 1980s. Researchers explored issues of student achievement, self-concept, and affect across these service delivery arrangements. While it is possible to argue that setting is less important to student growth than what *occurs* within that setting, Leinhardt and Pallay (1982) explained that

> it is precisely because it [setting] is a macrovariable with clearly understood parameters that it has such potency with respect to policy decisions and is so

readily interpreted by the public. Its visibility and alterability make it worth studying, *not* the magnitude of its influence on achievement. (p. 560)

Carlberg and Kavale (1980) published a meta-analysis of research on pullout special education placement versus general education placement for students with low IQs, LD, emotional disabilities or behavioral disabilities (ED/BD) in terms of achievement and social/personality variables. The authors' purpose was to provide an empirical foundation for the mainstreaming movement, which they suggested was based only on a philosophical commitment. They reviewed 860 studies from 1932 through 1975 of which only 50 met the criteria for inclusion in the actual analysis. The authors noted that many studies resulted in inconclusive findings due to the lack of a treatment effect, lack of power due to small sample size, and lack of internal validity due to the lack of comparison groups and random assignment in the methodology employed. Calculation of effects sizes indicated students with low ability benefited from general education class settings while students with LD, ED, or BD (who were combined as one category) did better in special education classrooms across the variables tested. The combined category, which included students with LD, would make it difficult to determine the effect specific to this population. Recent researchers have questioned this early meta-analysis citing reliability and validity concerns for tests employed in the studies reviewed (Marston, 1988).

Leinhardt and Pallay (1982) reviewed the research on the educational and emotional impact of restrictive settings for students in the lowest quartile academically whether or not students were identified for special education. They concluded that while setting alone may not be a powerful determiner of student achievement, setting may

influence variables cited as important to student growth such as small class size, high content overlap, mastery learning systems, time engaged in cognitive activities, relatively swift instructional pacing, formal management systems, positive teacher affect, increased teacher instructional time, and positive self-concept. These variables can exist across settings, but some (e.g., behaviorist programs) are easier to achieve in restrictive settings and others (e.g., rapid pacing and high expectations) in mainstream settings.

The majority of early comparative studies of the relative success of various service delivery models involved students classified with educable mental retardation (Beck, Lindsey, & Frith, 1981). These studies were often used to discourage the use of self-contained placements for students with learning disabilities (Ito, 1980) despite the studies' questionable generalizability to the academic achievement of students with LD due to differences in learning styles that have long been acknowledged (Strauss & Lehtinen, 1947; Sutaria, 1985).

Studies of the academic achievement of students with learning disabilities as a function of placement have been inconclusive. Some studies have indicated no difference in achievement in resource, versus itinerant or integrated classroom models (Affleck, Madge, Adams, & Lowenbraun, 1988). Beck and colleagues (1981) reported that only arithmetic achievement increased significantly with longer placement in a self-contained class whereas IQ scores declined. Each of these studies failed to control for inter-group differences on variables such as intelligence, severity of disability, retention, and so on, although SES and ethnicity were noted as being similar. Olson and Midgett's (1984) analysis of similarities and differences among male students with learning disabilities

placed in resource or self-contained classes yielded IQ as the only significant difference between subjects.

Studies of self-esteem also provide confounding results. For example, Smith (1980) found that students with learning disabilities had higher self-regard when they received special services outside of the regular classroom than in mainstreamed classes for half the day in math and reading. Full-time placement in general education was then simulated by asking the students to complete a self-concept survey using their experience in general education as a reference point. The author proposed that, contrary to his original hypothesis, removal from special classes and inclusion full-time in regular classes did not increase students' self-esteem by removing the stigma of the special class; however, this was based on students' predictions of a full-time placement rather than actual experiences. Mainstreaming for math and reading rather than content subjects may be questioned in this study, as students with LD may have average general information knowledge that could be applied to content subjects but struggle more in language arts and mathematics. Ray (1985) used teacher ratings, sociometrics, and direct observations of students with and without disabilities in mainstreamed classes. ("Mainstreamed classes" was not defined.) Studying students in third through sixth grade, Ray found that students with disabilities were viewed more negatively by teachers and peers, but did not differ in actual amounts of positive and negative interaction.

Thurlow, Ysseldyke, Graden, and Algozzine (1984) conducted a study with elementary-school-age students with LD receiving five levels of special education service. The researchers recorded behaviors for targeted students over two complete days, tracking academic responding. They compared Peabody Individual Achievement Test

(PIAT) scores pretest-posttest as an achievement measure. The PIAT correlated with student response rates; however, academic responding was low for all students with great individual variability and minimal differences across settings. This led the authors to propose that "service delivery may be an irrelevant dimension" (Thurlow et al., 1984, p. 66) and that intensity of instruction should be the focus of determining appropriateness. While the statistics were calculated for repeated measures, the great individual variability and minimal difference may have resulted from the influence of sampling such a small number of students. One way ANOVAs were conducted with sample sizes of only three students for four of the five subgroups and fourteen for the mid-range level of service. Another caution in interpretation was the administration of the PIAT at the beginning and end of the same school year for some of the students. Retesting within less than one year would make the PIAT a questionable choice for such measurement.

A similar study of mainstreamed classes, self-contained special education classes, and special education resource rooms was conducted with students with LD, ED, EMR, and without disabilities in second through fourth grade (Ysseldyke et al., 1987). Less academic time was allotted for students identified as EMR, yet overall, a greater proportion of academic time was observed in special education settings than in general education. No significant difference was found for academic time allotted between students with and without disabilities, leaving the authors to question whether special education services were supplanting rather than supplementing the curriculum and how students who were behind would be able to catch up if the same amount of time were allotted to instruction.

A different methodological approach was used by Marston (1988) to compare the reading performance of students in elementary grades scoring below the 15th percentile on state benchmark tests. Students were assessed using curriculum-based measures (CBMs) to track reading achievement in general education classrooms. Students subsequently identified for special education were followed in special education resource rooms. Marston found that reading achievement was significantly stronger statistically following placement in the resource room model. No comparison was made with students who remained in the general education classrooms, nor were data reported regarding class size that would indicate if changes in student-teacher ratio might have impacted results.

McIntosh, Vaughn, Schumm, Haager, and Lee (1993) looked at student and teacher behaviors and interactions using direct observation of general education science and social studies classrooms with mainstreamed students with LD in grades 3 through 12. Few differences were found in teacher behaviors when working with students with LD compared with their peers, although more modifications were made at the elementary level. Students with LD interacted less with their teachers. This included less negative behavior and lower negative behavior ratings for students with LD by their teachers. The authors suggested students with LD were passive learners who had an unspoken agreement with their teachers: "You don't bother me and I won't bother you" (p. 259). The primary method of instructional delivery observed was whole class. No information was reported on any professional development teachers had experienced to accommodate students with LD or any support the teachers or students received from special educators (e.g., consultation). With little modification observed and minimal participation by

students with LD, the researchers questioned whether these students were achieving academically in such settings; however, student achievement was not addressed in this study.

Wang and Baker (1986) conducted a meta-analysis starting with the final year of the Carlberg and Kavale (1980) study. Eleven empirical studies were selected from 264 reviewed dating from 1975 to 1984 that compared mainstreaming and pullout services and/or pre- postmainstreaming outcomes. The majority of studies (75%) were attitudinal, 13% analyzed performance, and 12% looked at instructional process. Effect sizes (ES) ranged from -1.86 to 1.91, with 65% being positive for mainstreamed settings. An exception to this positive effect was the performance of students with LD, as indicated by a negative effect size for this group. The authors suggested the more positive results for mainstreaming found in this meta-analysis compared with the 1980 study was due to the use of more effective mainstreaming practices. It should be noted that only 3% of the student population for included studies were students with learning disabilities, while 53% were students with MR, 19% were students with hearing impairments, and 25% had no identification of disability. The Carlberg and Kavale study noted positive ES for students with MR, as well. No differentiation of mainstreaming was included beyond full time in general education or resource room placement. The researchers did note that the same design features found in the effective teaching literature were associated with positive ES. Such features included "continuous assessment, alternative routes and a variety of curriculum materials, individualized progress plans, student self-management, peer assistance, instructional teaming, and consulting teachers" (Wang & Baker, 1986, p. 518).

Comparisons of resource room progress in mathematics with reintegration into general education were conducted by the Fuchs and their colleagues (Fuchs, Fuchs, & Fernstrom, 1993; Fuchs, Roberts, Fuchs, & Bowers, 1996). These studies found that math achievement slowed when students returned to general education classroom despite incorporation of a transition process. The studies did not discuss any special education supports that followed the students into the general education classroom and limited treatment time may have failed to account for student adjustment to a new environment and the associated learning curve of such changes.

These studies did not address students in general classrooms receiving special education support within that setting. There were no descriptions of additional support provided during the time students were in general education classes. In addition, the number of studies conducted with students with learning disabilities was limited. Other criticisms included the lack of carefully constructed control groups, limited description of student populations, small sample sizes for the statistical analyses performed, and the questionable validity and reliability of the instrumentation employed (Marston, 1988; Salvia & Ysseldyke, 1995), including questions regarding whether psychometric tests are valid for edumetric purposes (Marston, 1988).

Research Involving Teacher Collaboration

Overlapping chronologically with more recent research based in the more traditional model of mainstreaming is the study of practices designed to increase support for students with disabilities within the context of general education. While the use of co-teaching to provide more inclusive experiences to students with disabilities has become more popular, the research base supporting its effectiveness is limited. A number of

authors (Crockett, 1997) have commented that the literature on collaboration tends to describe the process, acknowledge the barriers that exist, and outline the skills required for implementation. However, the number of objective investigations are of extremely small magnitude (Boudah et al., 1997, p. 294). This observation is beginning to change as the calls for accountability in education increase. The following discussion summarizes research involving co-teaching. It is divided into two sections to delineate studies in which teacher collaboration was a component in a larger initiative of school reform orchestrated through joint school-university projects from studies that focused primarily on co-teaching.

Joint university-school projects. Some of the earliest studies that included special education support within the general education classroom were collaborative initiatives between university researchers and school systems. These projects often involved the development of a multifaceted program including teacher training, adjustments in staffing, and increased access to resources.

Wang and Birch (1984a, 1984b) researched the Adapted Learning Environments Model (ALEM), which was designed to provide highly structured diagnostic-prescriptive learning coupled with open-ended exploratory learning for students with special needs, including learning and emotional disabilities, visual impairment, and giftedness. The results of the first study, which focused on feasibility, implementation, and student achievement, indicated a high degree of appropriate implementation by teachers, increases in student engagement in learning over time, and increases in math and reading performance. Only percentile scores were reported and no comparisons were made with a control group. A second study employed random assignment with pretest-posttest

comparisons using ALEM and a traditional resource room model. The authors reported a positive direction of change for the ALEM model, but did not provide statistics for the achievement and attitudinal data collected.

A nonequivalent control group design was employed to study the Integrated Classroom Model (ICM) (Affleck et al., 1988). ICM was administered jointly by general education and special education staff with support from the University of Washington. The teacher in the classroom was a former special education teacher or had special education endorsement. The teacher had the support of a special education paraprofessional for 1.5 to 3 hours per day. The same materials and methods were used in ICM and resource room programs. When ANCOVAs were calculated, placement yielded no statistically significant differences in achievement for students with LD or their typical peers.

Deno and colleagues compared several models included in the Minnesota Educational Effectiveness Project (MEEP) with traditional resource room programs (Deno, Maruyama, Espin, & Cohen, 1990). Students with mild disabilities and their peers identified as "low achievers" were compared based on placement in resource rooms in rural school systems or integrated models (ALEM, Companion Reading Program, and Data Based Intervention Model) in rural, suburban, and urban systems. Using a variety of instruments were used to collect data on school effectiveness and student achievement, the authors concluded there was "insufficient evidence that either approach is more appropriate" (Deno et al., 1990, p. 161). It should be noted that pretesting-posttesting occurred in January-February and April-May, making the short time span a potential factor in the lack of statistical findings. In addition, even though pretest and posttest

scores were available on only 15-20 students, ANCOVAs were calculated for differences in student achievement.

Project MELD was an effort to include students previously instructed in self-contained classrooms for students with LD in general education classrooms with the use of co-teaching and consultation (Zigmond & Baker, 1990). The study of this project involved one urban elementary school with teachers who received training from the researchers prior to implementation. Despite training, the researchers did not see evidence that teachers changed their teaching methods. The students with LD adjusted to less individual attention and demonstrated acceptable behavior but made no significant academic progress. Again, sample size was small (13 students), no comparison could be made with students who remained in self-contained settings, and some may question the label of learning disability when the identified students had IQ scores ranging from 70s to 90s with only one student having an IQ greater than 100. Grade-level CBMs were used to monitor academic progress. If students were reading significantly below grade level and the CBM started above the students' ceiling, it was not clear from the study that any progress would be evident.

A large school district in Florida collaborated with the University of South Florida to conduct a qualitative case study of a co-teaching model called FUSE, Florida Uniting Students with Exceptionalities (Evans, Harris, Adeigbola, Houston, & Argott, 1993). In this model, a special education teacher was paired with one or two general education teachers to provide instruction to classes in which 4 - 8 students with mild learning or emotional disabilities were included. The study emphasized the congruence of the FUSE

model with other restructuring initiatives. Preliminary results indicated some increase in self-esteem and lower discipline referrals as a result of participation in the program.

Stevens and Slavin (1995) attempted to compare students in a "cooperative elementary school" with students in neighboring schools. The researchers defined a cooperative school as using cooperative learning techniques in academic subjects and including students with LD in general education classrooms with special education teachers used in team teaching arrangements. Other initiatives put in place included peer coaching among teachers, collaborative instructional planning, principal and teacher collaboration in school planning and decision making, and encouragement of parent involvement (many of the key elements identified in the effective schools movement). After two years of implementation, students in the cooperative elementary school had higher reading vocabulary, comprehension, language expression, and math computation than the control students. In addition, social relations measures were significantly stronger for students with LD in the cooperative model. As the authors acknowledged, the complexity of interventions prevented separation of elements to analyze impact.

A quasi-experimental pretest-posttest study of co-teaching in one large elementary school described a model in which general educators and special educators co-taught 45-90 minutes/day with co-planning 30 minutes/week (Klingner et al., 1998). University support provided professional development and problem-solving support. Three language arts strategies and classwide peer tutoring were introduced gradually through the school year. Reading and math achievement were measured for all students in the classrooms. Overall, 82% of the students made gains, 80% of the students with LD made considerable gains while the remainder did not demonstrate improvement; 97% of

high achievers and 74% of low to above-average achievers also made progress. Finding that very poor readers, as a group, made no progress, the authors suggested that these very weak readers may require pullout services. Since the four strategies were introduced gradually every nine weeks, the impact of strategies introduced later in the year may not have been fully realized. It is noteworthy that the strategy most likely to impact very weak readers was introduced last, which could have affected the results. Without a control group, however, this possibility could not be explored.

Co-teaching studies not affiliated with university-developed models. While not identifying service delivery as co-teaching, one study attempted an experimental design with pretest-posttest achievement measures, larger sample sizes, and random assignment into resource room treatments, consultation, or consultation and in-class special education support (Schulte, Osborne, & McKinney, 1990). Efforts were made to randomize assignment, but special education procedures were followed to ensure appropriate school and parent permission was obtained. IEPs were not changed if the team considered the randomized assignment inappropriate for the student. The consultation with in-class support treatment yielded small but significant gains over the resource room treatment and teachers viewed the addition of in-class support as more effective than consultation alone.

A high school model for co-teaching linked with computer technology was evaluated in terms of teacher and student attitudes and student achievement (Nagurka, 1995). COILS, Co-Taught Integrated Learning System, was employed in English, social studies, and algebra classes. Data reported for the first year of implementation were based on pretest-posttest results from January through May, acknowledged as a limited time

frame. Gains were recorded in math and reading for all participating students, with greater gains made by students with LD. These gains were reported as percentages with no further explanation to allow interpretation.

A large study of inclusive programs around the United States was conducted in the early 1990s (Baker & Zigmond, 1995). The researchers sought to describe the context for inclusion, the models employed, the roles of special education teachers and students' educational experiences. The qualitative study utilized classroom observations, interviews with administrators, teachers, students, and parents, and the administration of the Basic Academic Skills Samples (BASS) to all students in participating classrooms. A case describing an elementary school in Virginia employing a collaborative teaching model was included in this study (Baker, 1995). The authors raised questions about how the instruction for students with learning disabilities was being individualized to meet student needs and reported poor performance on the BASS for students with LD. Analysis of case data was not shared with participants for further clarification. It should be noted that the BASS is a timed test (Jenkins & Jewell, 1992). Since many students with LD have slower processing speeds, it is unclear whether the skills assessed were the actual academics, speed of processing, or both.

Other qualitative studies focusing specifically on co-teaching have generated more balanced findings identifying both benefits and challenges. For example, Gerber studied academically able students in special education and their peers in co-taught classrooms. Focus groups and individual interviews were conducted with administrators, teachers, students, and parents. Findings were similar across grade levels. Identified advantages included improved achievement, behavior and self-concept for students with

disabilities, preventive benefits for students without disabilities, and fostering of professionalism for co-teaching partners. Cited disadvantages included teachers feeling they were spread too thin and had insufficient planning time and training (Gerber, 1996; Gerber & Popp, 2000a).

Similar results were reported by Walther-Thomas (1997), who utilized classroom observations, interviews, school documents, and informal contacts to study co-teaching teams over time. Challenges included planning time, scheduling, large caseloads, administrative support, and professional development. Benefits were improved academic performance and peer relationships for students and teacher satisfaction and growth with professional and personal support.

Several efforts to compare co-teaching models with traditional service delivery models have been made. In one study, a non-equivalent groups pretest-posttest design was used to compare special education teacher satisfaction and reading progress in pullout resource rooms with full inclusion (using collaborative teaching) and combination service delivery models (Marston, 1996). Teacher satisfaction was highest for combination programs and lowest for full inclusion. A possible explanation for lower teacher satisfaction with fully inclusive programming may be found in a study of supports and resources required by teachers compared with actual access to those supports (Wolery, Werts, Lisowski, Caldwell, & Snyder, 1995). The greatest need and lowest access ratings were reported as teacher training. Those who reported smaller discrepancies between access and need for training also reported higher success ratings. Limitations of this study included a low teacher response rate (37%) and no surveying of general educators participating in the models. In terms of reading progress, the results

were statistically significant for the combined program as well. The researchers suggested that programmatic differences led to greater student engagement in the mixed model. This variable was not a component of the study and seemed to have been proposed based on the researchers' informal experience with the models studied rather than empirical data.

An experimental design was employed to compare instructional actions of teachers, teacher satisfaction, student engagement, and student academic performance (students with disabilities and students identified by teachers as low achievers) at the secondary level (Boudah et al., 1997). Teachers in the experimental classes received training in the Collaborative Instruction (CI) Model, which addressed co-teaching arrangements and the use of strategy training for students. Using time sampling and field notes, the researchers noted an increase in role exchanges and instructional uses of time for classes in the experimental group. Student engagement was low and noninstructional behaviors represented the greatest percentage of time in both groups. Teachers were generally satisfied with the process and outcomes of the CI Model and use of strategies was significantly stronger for students in the experimental group. The classrooms had approximately 22 students with at least 4 identified with mild disabilities and a comparable number of students identified as low achievers. The finding of low instructional time is consistent with earlier research reporting lower levels of instructional time for students in Title 1 schools (Greenwood, 1991; Greenwood et al., 1986).

Several other studies have explored co-teaching in programs that included a variety of inclusive practices. An early study that sought to compare full inclusion and noninclusion elementary school programs was conducted by Liddiard (1991). Here,

students with severe LD and other disabilities were included in general education classrooms. The performance of their classroom peers on standardized reading and math tests was compared to that of students in classrooms without inclusion. Results of t-tests indicated that the academic performance of students without disabilities was not negatively impacted by participation in inclusive classrooms. A more recent study (Rea, 1997) compared the performance of middle school students with LD in inclusive classrooms and pullout special education programs. Controlling for such demographic data as age, gender, ethnicity, intelligence measures, socioeconomic status, and years in special education, Rea found that the two programs differed significantly. Students with LD in inclusive classes earned higher grades and attended more days of school than students with LD in the pullout program (both groups were comparable on standardized test scores and behavior infractions). In addition, the types of IEP goals and objectives were qualitatively different. IEPs for students in the inclusive school had a greater focus on strategy development and success within the general education curriculum whereas IEPs for students serviced in the pullout program focused more frequently on basic skills.

Participation of Students with Disabilities in Standards-Based Assessments

Key components of standards-based school reform have been the development of educational standards, followed by the creation of assessment measures, and finally the reporting of performance on these assessments as an accountability measure. While higher standards were being espoused for students, many "students with disabilities continued to be served in separate classrooms, taught a different curriculum, and excluded from participation in the large-scale national, state, or district assessments used to measure achievement" (Bechard, 2000, p. 1). An estimated 4 - 50% of all students

were not tested in large-scale assessment programs, and many students with disabilities were excluded (Erickson, Thurlow, & Ysseldyke, 1996).

With IDEA 1997 and the subsequent Federal Regulations in 1999, came the requirement that all students with disabilities be included in state and local assessments. This may be done through participation in the same assessments as administered to other students, through participation in the same assessments with accommodations and modifications, or through the use of an alternative assessment. Just as reformers in general education have looked toward assessment to ensure specific content is taught, special education reform efforts have looked toward *participation* in such assessment to ensure students with disabilities are taught. Thus, the adage "that which is tested gets taught" has been expanded to include "he who is tested gets taught" (Erickson et al., 1996).

While state testing aligned with adopted standards is relatively new, several studies have analyzed participation rates of students with disabilities in such assessments. The National Center on Educational Outcomes (NCEO) has conducted seven surveys of directors of special education since 1991. In its most recent report on data collected in 1999, the NCEO notes an increase in the number of students participating in statewide testing, though documentation of participation was inconsistent. Also, high stakes for schools and districts and lack of exposure to critical test content were perceived as significant inhibiting factors to the inclusion of students with disabilities in established testing programs (Thompson & Thurlow, 1999). Only 31 states reported that test participation rates were calculated for students with disabilities. Of these, the

participation ranged from less than 10% to 100% for students with disabilities. Data for Virginia were not available in 1999.

In a qualitative study of the actions of principals and teachers to increase the academic achievement of students with disabilities across three elementary schools in Virginia, Driver (2000) found that resources, staff development, and instructional accommodations were being implemented. Other critical elements from the literature, such as a vision-based plan, family and community involvement, collaboration, and tailored and high-quality instruction, were absent. Driver noted little specific effort being made to promote the success of students with disabilities in the standards-based assessment.

Virginia's Special Education State Improvement Plan (VDE, 2000) reported participation rates for the aggregate of students with disabilities and pass rates for students with LD by grade and test. In 1999, 71% (fifth-grade English) to 89% (third-grade English) of third- and fifth-grade students with disabilities participated in SOL Tests. For students with LD in these grades, 18% to 53% passed the SOL tests taken.

A study of participation rates in a Virginia school division looked at participation and pass rates for students with disabilities on the Virginia SOL Tests (Spady, 2001). Using division data for students in elementary grades since the first year of SOL testing, Spady reported that participation rates for all students with disabilities ranged from 36% (third-grade English in 2000) to 70.5% (third-grade mathematics in 1999) with passing rates from 19.1% (fifth-grade mathematics) to 46.1% (third-grade science). Such low participation and pass rates led the author to question future outcomes for students related to dropout prevention and high school graduation.

Correlation of Previous Research with Current Study

The studies reviewed in this chapter investigated a wide variety of factors related to collaboration and special education service delivery. The complexity of interacting variables in educational settings challenges researchers to develop studies that are meaningful for practitioners. Many of these studies were largely descriptive. Studies tended to focus on single models, sometimes with extensive interventions including a wide array of variables that made it difficult to attribute difference to particular components. Studies of single models without comparison groups were common. In addition, there was a lack of statistically significant results and conflicting results. Table 2 provides a summary of the research most directly associated with this study as it relates to the specific questions identified, namely; student achievement, instructional practices, teacher perceptions of efficacy or satisfaction, and participation in standards-based assessment.

Table 2

Summary of Research Related to Questions for the Present Study

Study Author(s)	Student Achievement	Instruc-tional Practices	Teacher Perceptions/ Satisfaction	Participation in Assessments
Affleck, Madge, Adams, & Lowenbraun (1988)	•	•	•	
Baker & Zigmond (1995)	•	•	•	
Boudah, Schumacher, & Deshler (1997)	•	•	•	
Deno, Maruyama, Espin, & Cohen (1990)	•	•	•	
Evans, Harris, Adeigbola, Houston, & Argott (1993)		•	•	
Gerber (1996); Gerber & Popp (1999, 2000a & 2000b)		•	•	
Klingner, Vaughn, Hughes, Schumm, & Elbaum (1998)	•	•		
Liddiard (1991)	•			
Marston (1996)	•		•	
Nagurka (1995)	•		•	
Rea (1997)	•	•		
Schulte, Osborne, & McKinney (1990)	•	•	•	
Spady (2001)				•
Stevens & Slavin (1995)	•	•	•	
Thompson & Thurlow (1999)				•
Walther-Thomas (1997)		•	•	
Wang & Birch (1984a, 1984b)	•	•		
Wolery et al. (1995)			•	•
Zigmond & Baker (1990)	•	•		

Intersection of Effective Schools and Successful Inclusion

The research (Gerber, 1996; Gerber & Popp, 1999; Gerber & Popp, 2000a & 2000b; Tindall, 1996; Walther-Thomas, 1997), theoretical (Idol, 1997; Malloy & Lillie, 1997), and the educational practice literature (King-Sears, 1997; Walther-Thomas et al., 2000) emphasize the need for creating a shared vision that puts the needs of students first and is supported by parents, teachers, and administrators. Other identified prerequisites include the provision of adequate professional development opportunities, resource allocation that includes prepared personnel and planning time for collaboration and problem solving to deliver effective instruction, acknowledgement of the change process and people's varying levels of acceptance of new initiatives, as well as ongoing evaluation and refinement based on data.

The overlap in goals and essential elements for successful implementation found between recent general education and special education efforts provide multiple avenues for dialogue and collaboration. How closely the proposed reforms found in both special education and general education align will influence the success of efforts to include students with disabilities effectively in general education curricula. At this intersection, shared goals must be identified and divergent goals reconciled. Information gleaned from research on essential elements that increase success for all students is a critical component in such an analysis. Current research and theory suggest many common elements that are required to develop and implement effective programs for all students. Across the literature on effective schools and inclusion is the need for a shared vision of the school's purpose and the need for high expectations for students with ongoing assessment and accountability measures. Another common theme is the importance of

collegiality and collaboration among teachers coupled with ongoing professional development. Such commonality offers many avenues for dialogue and creation of effective service delivery models.

While much overlap can be identified, the current focus on increased expectations and accountability raises questions regarding how students with disabilities can effectively participate in general education programs and how their participation may impact the learning of their peers. To respond to such questions, further study is needed. Early studies of special education delivery systems no longer reflect the current context within which services are provided. Being time- and context-bound (Shavelson, 1988), such data lose their applicability to current decision making. In addition, existing studies are limited in number and present concerns regarding technical adequacy, such as the lack of clear descriptions of students and programs, and limited sample sizes. The increasing stakes of accountability measures necessitate greater knowledge of the impact of service delivery models on the learning of all students in the system. The current study sought to increase this knowledge base by exploring student participation and success in standards-based assessments across two models of special education service delivery and identifying teacher perceptions of program efficacy.

CHAPTER 3

METHODOLOGY

The major purposes of this study were to compare differences in student achievement, instructional arrangements employed, and teacher perceptions of efficacy between programs using pullout resource room models or co-teaching models for delivery of special education services at the third- and fifth-grade level. In addition to identifying differences between the service delivery models, differences in achievement for students with LD and their typical peers at varying achievement levels were explored. This chapter is divided into six sections: statement of the research questions, description of the research instrumentation, description of the procedures, description of the participants, treatment of the data, and ethical considerations.

Research Questions

Descriptive Questions

Due to its high level of complexity, the nature of classroom interactions does not lend itself to unidimensional quantitative measures (Greenwood et al., 1986; Oakes, 1989; Shavelson, 1988). However, what occurs at the classroom level has direct impact on student performance and achievement (Leinhardt & Pallay, 1982). Therefore, the following questions were intended to describe instructional arrangements and teachers' perceptions of the service delivery model as implemented at the level closest to students. These questions required a combination of quantitative and qualitative analysis.

1. What instructional arrangements are employed, and how frequently, by third- and fifth-grade teachers in co-taught general education classrooms, general education without co-teaching, and pullout special education resource rooms?
2. What are teacher perceptions of the efficacy of the models they use to provide instruction, including what do teachers perceive as the greatest strengths of their current model and what changes would they make to improve the model?
3. Do teachers perceive differential impact of their current model on groups of students with and without LD in their classrooms and does this vary by model setting?
4. What percentage of all students with learning disabilities in the selected classrooms is: (a) exempt from standardized testing; (b) tested with modification; and (c) tested using standard administration?

Statement of the Null Hypotheses

Simpson (1996) suggests that "whenever possible, more quantitative methodologies are preferable [over qualitative] because they lead to decisions about policy and practice that are based on more valid and reliable evidence" (p. 224). While qualitative researchers might argue the accuracy of this statement, the call for quantitative evidence "to document the most effective ways to deliver services to students" (p. 227) can be heard from policy-makers, educators, and the public alike. The following null hypotheses were proposed for statistical analysis in this study.

$H1_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for third- and fifth-grade students with learning disabilities in co-taught general education and pullout special education resource classrooms.

$H2_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for fifth-grade students identified as below-average, average, or above-average in general education classrooms with co-teaching or without co-teaching.

$H3_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for the aggregate of students by grade level based on the model of special education service delivery available for students with LD in the classroom.

$H4_0$: There will be no significant relationship ($p \leq .10$) between student performance as demonstrated by scaled scores on the fifth grade Virginia SOL Tests and these same students' performance on prior achievement testing when disaggregated by subgroups of LD, below-average, average, and above-average.

$H5_0$: There will be no significant relationship ($p \leq .05$) between the aggregate student performance as demonstrated by scaled scores on the Virginia SOL Tests and these same students' prior standardized test performance.

Description of Research Instrumentation

Virginia Department of Education (VDE) School Level Reports

In 1999, the VDE began issuing annual school performance report cards based on the 1997 Standards of Accreditation. The report card provides information on academic achievement of students using SOL test performance and other general information such as fall membership, average daily attendance, percent of free and reduced price lunch, and safety information related to violence and weapons. Performance report cards for Virginia schools are available at on the VDE website; however, only data for 1997-98

were available at the time of this study. Therefore, the researcher accessed alternative VDE web-based reports to obtain fall 1999 membership, percent of free and reduced price lunch and accreditation status for the year of SOL testing for participating schools.

Teacher Questionnaire

The teacher questionnaire was customized for special education teachers and general education teachers. Appendix D includes copies of the questionnaires. The forms were reviewed and piloted by individuals who hold or have held similar teaching positions. Final forms were revised to streamline the data collection. Committee members and special education staff from the third participating school division reviewed the final version of teacher questionnaires.

Teachers were asked to provide basic demographic information about themselves and their setting. This included multiple-choice options and open-ended questions for the description of the service delivery model being implemented and frequency of instructional arrangements used. In addition, questionnaires included several open-ended questions regarding efficacy of participating teachers' current program and a Likert scale for rating specific student benefits of the current model. These items drew heavily on the benefits for students described in qualitative studies of co-teaching (Gerber, 1996; Gerber & Popp, 1999; Gerber & Popp, 2000a; Walther-Thomas, 1997).

Stanford Achievement Test, Ninth Edition, Form T, Abbreviated (Stanford-9 TA)

The Virginia Board of Education voted in October 1997 to approve the awarding of a contract for the Stanford-9 TA as the norm-referenced component of the Virginia Assessment System (La Pointe, 1996). Since its first administration in April 1997, the Stanford-9 TA has been administered to Virginia public school students in grades 3, 5, 8,

and 11 and grades 4, 6, and 9. (Changes were made in the grades assessed to avoid Stanford-9 TA and SOL testing within the same year, if possible. Therefore, fifth-grade students taking SOL Tests in 1999 have Stanford-9 TA scores from the spring of third grade whereas fifth graders taking SOL Tests in 2000 have Stanford-9 TA scores from the fall of fourth grade testing.) The Stanford-9 TA provides measures of student achievement in reading, language, spelling, study skills, listening, mathematics, science, and social science. Students are required to take the reading, language, and mathematics tests that comprise the abbreviated battery.

Reliability refers to the degree to which test scores are consistent or repeatable and free from error of measurement. Reviews of the Stanford-9 (Berk, 1998; Haldyna, 1998) indicated reliability was calculated using the Kuder-Richardson Formula 20 (KR-20) for the multiple-choice battery, the Kuder-Richardson Formula 21 for clusters, subtests, and totals, and alternate-forms coefficients. KR-20 coefficients were in the acceptable range from the mid .80s to .90s for most tests and subtests. KR-21 coefficients ranged from the .70s to the .90s. Alternate form coefficients were in the .80s for Total Reading, Total Mathematics, and Language tests and in the .70s or lower on other tests and subtests. According to personal email correspondence with Harcourt Brace Educational Measurement (HBEM), validity and reliability information is based on the total battery and information specific to the abbreviated form is not available.

Validity refers to the degree to which the test, in fact, measures what it purports to measure. Three types of validity have been addressed for the Stanford-9. Content validity was addressed through the review process by a panel of content experts, editors, measurement specialists, and teachers and by review for bias and/or stereotyping by an

advisory panel along with differential item functioning (DIF) to ensure items would be valid for all groups of examinees. Criterion-related validity was determined by correlations between the eighth and ninth editions. Construct validity was reported as correlations with the Otis-Lennon School Ability Test. Reviewers of the Stanford-9 suggest that school districts give this assessment tool strong consideration due to its technical strengths (Berk, 1998; Haldyna, 1998).

Standards of Learning (SOL) Assessment Program

In October of 1996 the Virginia Board of Education voted to contract with HBEM to develop "criterion-referenced tests designed to measure student mastery of the academic content and skills specified in Virginia's Standards of Learning" (VDE, 1998, p. 2). The tests were constructed by HBEM working with panels of Virginia teachers and other content experts. The SOL Tests were field-tested in the spring of 1997 and administered for the first time in the spring of 1998. According to the Standards of Accreditation, performance on the SOL Tests will be used in a variety of ways. Specifically, performance must be considered as one factor in promotion and retention decisions made at grades 3, 5, and 8 and can be incorporated in grading at the high school level. Passing a target number of SOL Tests will be needed to receive a high school diploma and accreditation of schools is dependent upon the percentage of students passing the SOL Tests (Finley & Harris, 1998).

At the third-grade level, students are assessed on their mastery of Standards of Learning content for kindergarten through third grade in English, mathematics, history and social science, and science. Fourth- and fifth-grade SOL Tests for English, mathematics, science, and technology are tested at the fifth-grade level. History and

social science may be administered in fourth or fifth grade. The tests are multiple-choice in format with the exception of English, which also requires students to write a composition in response to a writing prompt at the fifth-grade level (VDE, 1998).

The Virginia Department of Education released its report on the validity and reliability of the SOL Tests in February 1999. Based on reports from testing experts from three universities, the tests and the testing process demonstrated adequate reliability and validity (VDE, 1999). Several types of validity were addressed. According to the reviewers, the procedures used to ensure content validity were sound and included use of a Content Review Committee, review of statistical information from field-test administrators, and Virginia educators' collaboration with VDE and HBEM staff. Second, correlations with related measures indicated that SOL Tests school level performance in terms of rankings was similar to performance on the Stanford-9 TA and the Virginia Grade 6 Literacy Passport Tests. "Overall, approximately 28% - 72% of the variance in school rankings is shared between the Virginia SOL Tests and Stanford-9 TA and approximately 29% - 56% between the Virginia SOL and LPT tests, most falling nearer 50%" (VDE, 1999). The Kuder-Richardson Formula #20 was used to determine reliability for all SOL tests except English: Writing, for which person separation was used. KR-20 values ranged from .80 in Grade 5 History and Social Science to .91 on Grade 3 Mathematics.

Student Data Spreadsheet

A spreadsheet to collect individual student data was completed for each participating classroom. The data included demographics, previous standardized testing performance, SOL scaled scores, type of special education service delivery used in the

student's classroom during the previous two years, and disability label and testing exemptions/accommodations when appropriate. Student data were coded to maintain confidentiality. The school or central office took responsibility for completing this form and maintained a record of actual names and codes in the event that a record would require checking. This information was provided on manual forms or from computerized printouts. A sample spreadsheet may be found in Appendix D.

Figure 3, Data Collection Sources for Dependent and Independent Variables, provides a graphic depiction of the data collected throughout the study.

Description of Procedures

Gaining Access

Informal contact was made with potential school divisions during the development of the study to identify possible questions of interest to practitioners in the schools and the feasibility of data collection. In addition, these contacts were helpful in determining proper procedures for gaining access. Following proposal approval, school divisions were contacted to formally request access. Participation in the study was on a voluntary basis. Principals at sites nominated by central office personnel were contacted in writing and by telephone to determine their interest in possible participation and to answer any questions that arose regarding the study. A sample letter to principals in included in Appendix E. Upon verification of interest by phone, a packet containing the teacher surveys was distributed.

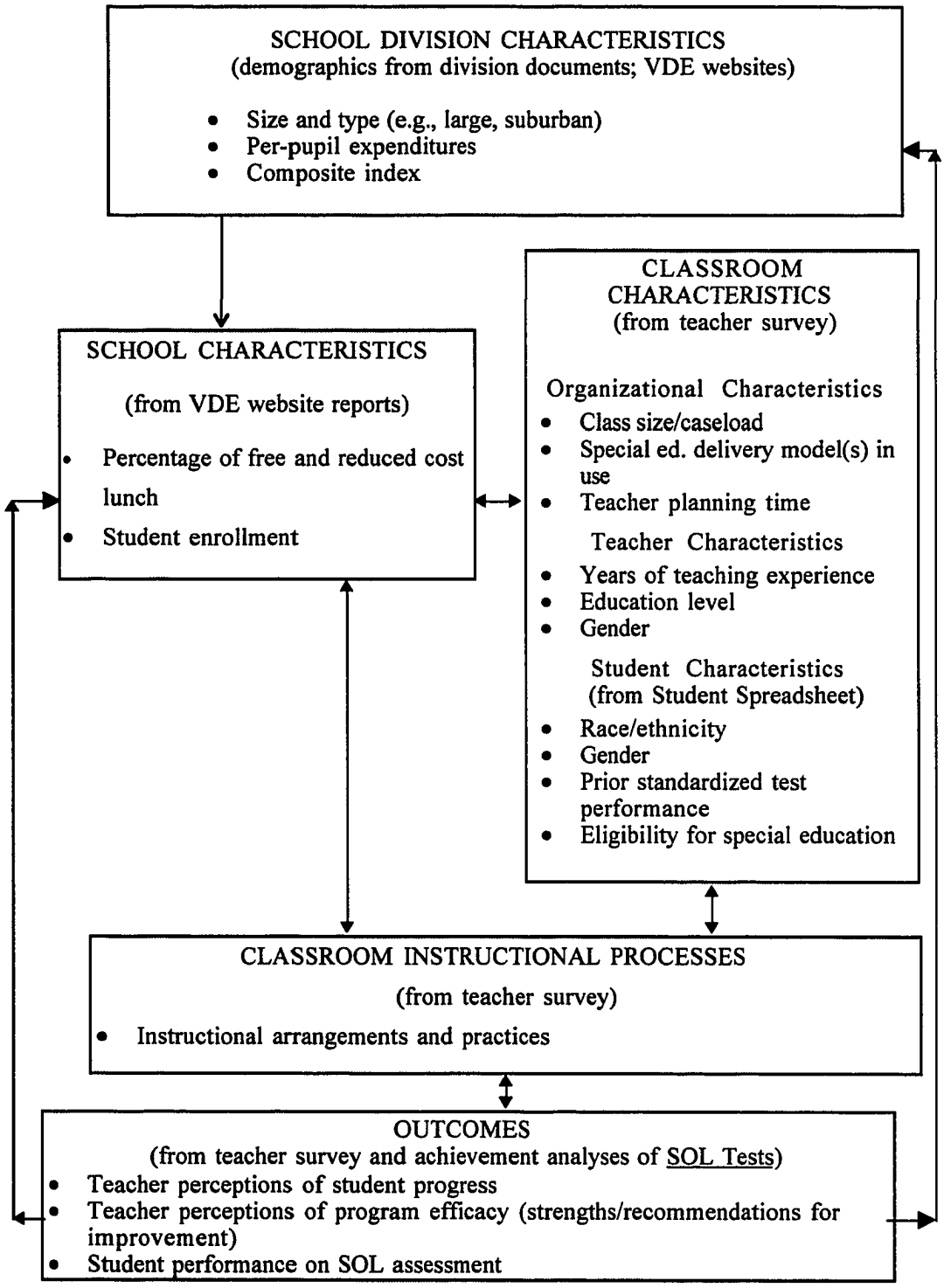

Figure 3. Data collection sources for dependent and independent variables.

Grouping Classification

Independent variables within this study were the type of special education service delivery model in place for the classroom and students' prior achievement level or identification has having a learning disability. Students with learning disabilities were identified based on IEP documentation, while groups for below-average, average, and above-average were determined by composite scores from the most recent standardized test administration prior to the year of SOL testing studied. Since prior achievement testing was available only for fifth graders in the study, classification for achievement levels and subsequent analyses for these subgroups included fifth graders only. To achieve adequate sample sizes, all students for whom prior achievement testing was available were included in the three achievement subgroups. Groupings were determined by cumulative percentages on the Stanford-9 TA composite scores with cutoffs at the 33.3%ile and 66.7%ile. Analyses based on aggregates included third and fifth graders.

Data Collection

The total enrollment and percentage of free and reduced cost lunch for participating schools were accessed through reports available from the VDE website. General education teachers were asked to share information about their class sizes and the types of services provided to their students. Special education teachers were asked to describe caseload characteristics such as the number of students, the number of classes and grades, the types of disabilities and levels of service provided to students. Both general education and special education teachers were asked to provide information about their number of years of teaching experience, education level, gender, and their

description of the special education service delivery model being implemented, including how instructional planning occurred.

Data for students were collected on a spreadsheet with each student being given a code number. The principal identified a person to complete these forms or central office personnel collected the data. If the student data were available through existing databases, existing reports were substituted for the manual spreadsheet.

Description of Participants

Virginia third- and fifth-grade teachers and their students were the focus of this study. The unit of analysis for instructional arrangements was the classroom, for perceptions of program efficacy, the teacher, and for achievement, the individual student. Data were collected for the 1998-99 and 1999-2000 school years.

Central office personnel knowledgeable of the local school division special education programs, such as directors of special education, special education specialists, and assistant superintendents of instruction, were asked to nominate potential schools for participation. Moderate to large elementary schools with programs perceived as effective were requested. Two types of target classrooms were sought: third- and fifth-grade classrooms with co-teaching and third- and fifth-grade classrooms in which students with learning disabilities received pullout resource room support (as defined in Chapter 1). Due to possible questions of greater severity leading to placement in more restrictive pullout settings when both models are available (Fuchs et al., 1993; Schulte et al., 1990), preference was given to classrooms in which only one of these models was currently in place. To achieve adequate sample sizes, classrooms with limited use of the second model were included. All eligible participants who volunteered and met the criteria for

the study were included to counter the impact of any attrition that might occur due to personnel changes, movement of students out of the school, or requests to withdraw from the study.

Three moderate-to-large school divisions in the central Virginia area granted access to conduct the study. Division per-pupil expenditures ranged from approximately $6,000/year to $6,700/year and the Composite Indices, calculations of financial resources, were in the middle to upper range of approximately 0.4 to 0.5. Five schools agreed to participate. Free and reduced cost lunch percentages for participating schools ranged from less than 1% to 14 % and fall membership ranged from approximately 600 to 750. Table 3 summarizes the participation of school divisions and schools in this study.

Table 3

Participating School Divisions and Schools

Division	No. Schools	No. Classrooms by Service Delivery Model
A	1	1 - resource room
B	1	2 - co-taught
C	3	School C1: 2 - resource rooms 3 - co-taught/mixed School C2: 4 - resource rooms 2 - co-taught/mixed School C3: 1 - resource room

Of the 25 teachers who agreed to complete surveys, 23 returned them. Seven special education teachers and 16 general education teachers completed questionnaires representing eight co-taught classrooms and eight general education classrooms having students with LD who received their special education services in a pullout resource room setting. Since special education teachers worked with multiple classrooms, they were asked to report on no more than two classrooms to avoid overrepresentation of a

single teacher's influence. Three special education teachers completed surveys for a single classroom and four included perceptions for two different classes. Two special education teachers, associated with two resource room classrooms each, did not return surveys. All participants were female. Table 4 summarizes the demographic data collected for teachers. Appendix A provides additional detail on the demographic characteristics for participating teachers.

Class sizes ranged from 22 to 26 students and caseloads for special education teachers ranged from 14 to 25. Of the 16 classrooms for which teacher questionnaires were received, individual student data coded to match with responding teachers were provided for 14 classrooms. Two general education teachers participating in a mixed model completed surveys that were not associated with student data but were included in the analysis of teacher data.

In the co-taught classrooms, the special education teacher and general education teacher collaborated to provide instruction to all students in the general education classroom 45 to 120 minutes per day. Most co-taught classrooms included one or two students who received additional special education support in a resource room setting. The second group of classrooms included students with learning disabilities who received special education instruction for less than 50% of the day in a pullout resource room. The students without special needs in the pullout model did not receive instruction from the special education teacher. In addition to co-teaching and resource room services, some consultation was provided as well. Most special education support focused on language arts and math instruction. Descriptions of the service delivery teachers reported are included in Appendix B.

Table 4

Demographic Characteristics of Participating Teachers

Teacher Characteristic	General Educator/ Resource	General Educator/ Co-teaching	Special Educator/ Resource	Special Educator/ Co-teaching
Total N	8	8	3	4
Grade level				
Third	3	1	1	1
Fifth	5	7	2	3
# of years at school				
(< 2 yrs)		2		
(2 - 5 yrs)	3	4		3
(5 - 10 yrs)	3		3	1
(10+ yrs)	2	2		
# of years teaching				
(< 2 yrs)				
(2 - 5 yrs)	1	1		1
(5 - 10 yrs)	2	2	1	1
(10+ yrs)	5	5	2	2
Highest degree				
Bachelors	5	8	1	2
Masters	3		2	2
# of years co-teaching				
(< 2 yrs)		3		
(2 - 5 yrs)		4		2
(5 - 10 yrs)		1		2
(10+ yrs)				
# of years co-teaching with current partners				
(< 2 yrs)		3		2
(2 - 5 yrs)		4		2
(5 - 10 yrs)		1		
(10+ yrs)				

To explore student achievement, a minimum of 20 students each was required for students with learning disabilities as identified by IEPs and students grouped as below-

average (lowest third), average (middle third), and above-average (upper third) based on composite scores from the administration of prior standardized achievement testing. Prior achievement testing was available only for fifth graders in the study. Therefore, classification for achievement levels and subsequent analyses for these subgroups included fifth graders only. To achieve adequate sample sizes, all students for whom prior achievement testing was available were included in the three achievement subgroups. No students with limited English proficiency were identified in the participating classrooms. Other disabilities reported on IEPs or 504 Plans for students in participating classes included other health impairment (OHI), emotional disturbance (ED), speech and language impairment (SLI), and orthopedic impairment. No students with severe and profound disabilities were included in the targeted classes and students receiving special education services for more than 50% of the day were eliminated from analyses. According to teacher report, there were 339 students in the 14 classrooms with individual data. Individual student data for analysis was available for 319 students. Missing data resulted from students who were absent on the days of testing, students who were no longer enrolled and whose records were not available, and students with disabilities who received special education services for more than 50% of the school day and were not the focus of this study. Table 5 summarizes the actual number of students identified for each category in the 14 participating classrooms. Appendix C includes additional detail related to student demographics.

Table 5

Student Demographics by Subgroup and Service Delivery Model

Student/Model	Co-Taught	General Education	Resource
Third graders without disabilities	19	61	
Fifth graders without disabilities	74	96	
Students with LD	26	(listed in resource)	26
Third	3		6
Fifth	23		20
Other disabilities	12	(listed in resource)	7
IEP	11		6
504	1		1
Below-average (fifth grade)	31	35	
Average (fifth grade)	35	29	
Above-average (fifth grade)	32	35	
Total students: 319	131	188	(included in general ed.)

Treatment of the Data

Procedures Utilized

Question 1. What instructional arrangements are employed, and how frequently, by third- and fifth-grade teachers in co-taught general education classrooms, general education without co-teaching, and pullout special education resource rooms?

Descriptive statistics are provided for teacher reports of the frequency of instructional arrangements employed. Further analysis was not pursued due to limited sample size. Statistics reported included percentages, means, and medians.

Question 2. What are teacher perceptions of the efficacy of the models they use to provide instruction, including what do teachers perceive as the greatest strengths of their current model and what changes would they make to improve the model?

Teacher perceptions were analyzed using qualitative methods to identify themes through reviewing, sorting, and grouping of responses to open-ended questions. Responses were typed verbatim into a word processing document and sorted by question with the selected font identifying the four types of teachers (general educator or special educator and co-teaching or pullout). Possible themes were identified by reviewing a printout of the document and color-coding the hard copy. As a structure for the themes emerged, the highlighted responses were copied into a table. The table was reviewed, adjustments were made by collapsing and adding themes and identifying subthemes, and the responses were resorted by these subthemes.

Question 3. Do teachers perceive differential impact of their current model on groups of students with and without LD in their classrooms and does this vary by model setting?

Descriptive statistics are provided for teacher responses to Likert-scale items related to progress for students with LD and their peers. Further analysis was not pursued due to limited sample size. Statistics reported included percentages, means, and medians.

Question 4. What percentage of all students with learning disabilities in the selected classrooms was: (a) exempted from standardized testing; (b) tested with modification; and (c) tested using standard administration?

Statistics include frequencies and percentages for each of the three categories for co-taught versus resource room. A chi-square was performed to determine any difference in participation rates by model.

Prior to testing the null hypotheses, ANOVAs and chi-squares were employed to determine whether the initial demographic data collected (such as student gender, ethnicity, and performance on prior achievement testing) reflected statistically significant different groups by service delivery model. Results of these analyses were used to select the appropriate statistics for testing the following null hypotheses.

$H1_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for third- and fifth-grade students with learning disabilities in co-taught general education and pullout special education resource classrooms.

Chi-squares were performed to address pass rates for third and fifth graders and a MANOVA was used to analyze scaled scores. Only fifth-grade scores were included in the MANOVA due to differences in tests administered at each grade level and smaller sample sizes for third grade.

$H2_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for fifth-grade students identified as below-average, average, or above-average in general education classrooms with co-teaching or without co-teaching.

A log-linear model was used to analyze pass rates for subgroups and a MANOVA was used to analyze scaled scores.

$H3_O$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for the aggregate of students by grade level based on the model of special education service delivery available for students with LD in the classroom.

Analyses by pass rate were performed using chi-squares and scaled scores were analyzed using MANOVAs.

$H4_O$: There will be no significant relationship ($p \leq .05$) between student performance as demonstrated by scaled scores on the fifth-grade Virginia SOL Tests and these same students' performance on prior achievement testing when disaggregated by subgroups of LD, below-average, average, and above-average.

$H5_O$: There will be no significant relationship ($p \leq .05$) between the aggregate student performance as demonstrated by scaled scores on the Virginia SOL Tests and these same students' prior standardized test performance.

For $H4_0$ and $H5_0$, a Pearson correlation coefficient was calculated by subgroup and for the total sample of students. Coefficients of determination were calculated to determine the strength of the association between prior testing and the SOL Tests. In addition, a regression analysis was performed to explore the predictiveness of Stanford-9 TA scores for SOL Test performance.

Ethical Considerations

Participants were notified in writing that their involvement in the study was voluntary and could be terminated at any time if they so desired. Confidentiality of participants was maintained. Only members of the committee had access to the identity of school divisions and individual schools. All data collection identified schools and

classrooms by a code maintained separately from the data. No identifiable information on individual students was collected. Quantitative data collected were reported in aggregate form and did not identify individual classrooms.

Participants were informed that the final report or executive summary would be provided to participants requesting a copy.

CHAPTER 4

FINDINGS AND RESULTS

This chapter will present the results of this study. The chapter has been divided into nine sections, which correspond to the questions and hypotheses established for the study.

Instructional Arrangements

Question 1: What instructional arrangements are employed, and how frequently, by third- and fifth-grade teachers in co-taught general education classrooms, general education without co-teaching, and pullout special education resource rooms?

Descriptive statistics are provided for teacher reports of the frequency of instructional arrangements employed. Percentages of completion for items were calculated including the two surveys that were not returned. The percentage of teachers completing each item ranged from 73.3% to 80.0%. Further analysis was not pursued due to the limited sample size. Statistics reported include frequency counts, percentages, means, medians, and standard deviations. The mean response and standard deviation for instructional arrangement items are presented for the three settings in Table 6. A tentative analysis (due to small sample sizes for setting, especially the resource setting) indicates little difference in instructional arrangements reported for classrooms with and without co-teaching. Possible differences existed for the resource room setting, where mean responses varied more than one standard deviation in four of the nine arrangements.

Resource room teachers reported using whole-group instruction and independent practice less frequently and computer-assisted and differentiated instruction more frequently than teachers in either of the general education settings. Additional detail on these items can be found in Appendix F.

Table 6

Mean Response for Instructional Arrangement Frequency by Setting

Instructional Arrangement	Setting	n	Mean	Standard Deviation
Whole group	General ed. with resource	9	1.00	.48
	Co-taught class	11	1.18	
	Special education resource	4	1.50	
Small group	General ed. with resource	9	1.56	.58
	Co-taught class	11	1.36	
	Special education resource	4	1.00	
Cooperative groups	General ed. with resource	9	1.56	.57
	Co-taught class	11	1.18	
	Special education resource	2	1.00	
Peer tutoring	General ed. with resource	9	2.00	.76
	Co-taught class	11	2.09	
	Special education resource	2	1.50	
Differentiated	General ed. with resource	9	1.56	.51
	Co-taught class	11	1.64	
	Special education resource	2	1.00	
Computer-assisted instruction	General ed. with resource	9	2.44	.70
	Co-taught class	11	2.36	
	Special education resource	2	1.00	
Multimedia (video, audio)	General ed. with resource	9	2.22	.70
	Co-taught class	11	2.36	
	Special education resource	2	2.00	
Lecture	General ed. with resource	9	1.44	.80
	Co-taught class	11	1.36	
	Special education resource	2	2.00	
Independent practice	General ed. with resource	9	1.00	.41
	Co-taught class	11	1.18	
	Special education resource	4	1.75	

Note. 1=often (daily/weekly), 2=sometimes (monthly), 3=rarely (less than monthly), 4=never.

Teacher-Identified Strengths and Recommendations

Question 2: What are teacher perceptions of the efficacy of the models they use to provide instruction, including what do teachers perceive as the greatest strengths of their current model and what changes would they make to improve the model?

Teacher perceptions, as recorded for open-ended questions related to strengths, recommendations for model improvement, and additional comments were analyzed using qualitative methods to identify themes through reviewing, sorting, and grouping of responses. Five themes were identified with accompanying subthemes. These included references to instruction and teacher roles, student achievement, affective or social issues, resources, and selection of service delivery model based on student readiness discussed in the following sections. Appendix G contains the table of themes and associated teacher quotes.

Instruction and Teacher Roles

Teachers wrote about the types of instruction they employed in their classrooms and how teaching roles were supportive or could be improved. For both models, teachers noted that a smaller student-teacher ratio allowed more small-group and one-to-one instruction and differentiation. "We were able to do more small-group and individualized instruction and tailor lessons to specific weaknesses," wrote a special education co-teacher while a general education teacher with pullout services noted, "The resource room provided a small-group setting where students could receive more frequent personalized instruction." Several co-teachers noted the flexibility the model afforded using comments such as, "Opportunities were endless with another teacher in the room. Allowed more flexibility in teaching in varied ways (grouping, etc.)."

Several co-teachers and teachers with pullout models who had co-taught in the past emphasized the importance of teaching special education strategies to all students in the class and for the general education teachers to learn these strategies, stating, "General ed. teachers have the opportunity to use strategies with her students from the L.D. teacher" and "Their [special educators'] instruction and strategies also benefited the non-LD students as well." Another benefit cited for co-teaching was related to monitoring of students' work and behavior. Teachers shared that, "Monitoring and redirecting occurred more frequently," "There are two thinking minds and two sets of hands and eyes."

Teachers also discussed their roles in the classes. Co-teachers noted that teachers shared responsibility and planned together regularly. "The co-teaching model was helpful to me because I had an expert in my room to bounce ideas off of, to offer perceptions of students and to help me find creative ways to meet the needs of *all* my students," stated a general education co-teacher. Among the specific jobs identified for special education teachers in both models were monitoring homework and classwork, remediating academics, teaching strategies, and advocating for the individual needs of students.

Student Achievement

No teacher response reflected a negative impact on students without disabilities for either model. The primary reference to student achievement with pullout models addressed the use of small-group instruction, which "enables students to excel where a large-group setting may hinder their progress." This "divide and conquer" approach was noted as helpful for students without disabilities in the comment, "When pulled out, students [with LD] were able to receive the personalized attention they required to

become successful. I was able to give general education students more attention when needed as well."

The majority of comments related to student achievement, including those of teachers who participated in pullout programs for the year of the study, indicated a preference for co-teaching with statements such as, "Co-teaching is most effective," "When looking long term I think collab is more beneficial," and "Co-teaching is excellent! I taught collab this school year, 2000-2001 [pullout general educator for 1999-2000]. I loved it and my students made *so* much progress with two of us to help with learning." Two identified factors for the achievement benefit of co-teaching were the presence of appropriate peer models and exposure to and mastery of the curriculum. Responses included, "If students are close to grade level in reading, I think the co-taught class challenges and motivates students as well as providing examples of appropriate responses and thinking processes involved in learning," "In addition, peer models are important for strengthening the skills of the LD students," and "The disabled students [sic] were exposed to and mastered a lot of the general ed curriculum."

Affective or Social Issues

Teachers described issues related to affective or social factors for themselves as well as their students. Across both models, teachers noted the importance of teaching and interpersonal skills in determining the success of either model. Several comments addressed the need to communicate shared goals for students. As one general education teacher participating in a pullout program noted, "I found the success of the delivery model is very dependent upon the qualities of the educators involved and the mix of students. I found that classes ranged from ineffective and enabling to very successful."

One general education teacher using a pullout program felt that the resource room provided students with "opportunities to interact with peers at the same level." Many comments across the two models suggested that co-taught programs for students with LD did not stigmatize students as a pullout program may. Teachers wrote, "All L.D. students felt included and not isolated," "Often children in the class did not know who the LD children were," and "Pullout students feel removed from the general education population, and the co-taught students do not." Addressing more than achievement issues, one co-teacher added, "We wanted to do it. The kids wanted to be in the classroom. I didn't want to use SOL scores to determine if it was a success or not. It was so much more than that."

Resources

The presence or absence of resources was a significant theme across both models and all questions in the survey. Identified subthemes included staffing and student grouping, teacher training, and time for planning. Presence of these resources facilitated the development of successful programs and increasing resources was frequently cited as a way to improve current services. In addition, the perceived lack of adequate resources generated responses that indicated high levels of stress and frustration for teachers.

Staffing. Student-teacher ratio for special education teachers was a common theme. Both general and special educators voiced frustration about special education caseloads. Specifically, teachers shared that, "The LD staff worked beyond expectations and were most supportive to the regular classroom teacher, especially given the number of students serviced by so few LD specialists," "There *must* be a change in the pupil/teacher ration in order to better service the *children's* needs," and "The most

important factor is teacher/student ratio. The frustration of the various models are directly responsible for my switch (after 12 years) back to regular education." Paperwork for special educators was a related factor with the amount of clerical work required being an added stressor as expressed in comments such as, "Less paperwork! More clerical help for LD staff," and "The special ed. case load is tremendous and their workload paramount for the low staffing provided by our school system. Additional LD instructors would help alleviate the astronomical amount of work required by these teachers." One special educator responded to the question, "Do you have any other comments you would like to share?" by writing, "Yes, but I have other paperwork piled high – I just wish LD students could have adequate and trained staff! Thanks for any help you can give them."

In addition to increased staffing to help special educators, recommendations to increase support for general educators also were offered. Suggestions for expanded support in general education classrooms involved providing special education aides or increasing the subjects that were co-taught. Science and social studies were not areas identified for special education support in either model; however, these subjects were areas of concern noted by several teachers. The following quotes provide a sample of the comments made. "Social studies and science was the problem. These children remained in the classroom without an aide. They did get special study guides but it was difficult for them. They left the classroom for the resource room to take their tests. I feel they received too much help," and "I feel the students (LD) met goals; however, the rate of progress may have been increased had the LD collab teacher been able to stay in class longer than 1 hour daily. The students truly need more than 1 hr of support daily."

Student grouping. In addition to providing additional special education support, establishing manageable groups of students with learning disabilities in resource and general education classrooms was suggested. Teachers suggested that there be fewer than eight students with disabilities in a given classroom. One teacher recommended that, "Classroom size (numbers) should be considered – a class of 24 students should not have 7 L. D. students in that class. These students should be distributed evenly across the grade level."

Teacher training. Only co-teachers identified the need for ongoing professional development. Topics included staff development in strategies, collaborative teaching, and reading instruction. "Ongoing teacher training is also important to keep the service delivery model successful."

Planning time. Time for planning was identified as important, and often lacking, in both models. Teachers shared that, "Planning time was difficult to 'find' due to varied responsibilities involved in general educational (team planning, meetings, paper work, etc.)" and "Special ed. teachers, both co-teaching and pullout, must plan with the general ed. teachers to have a sound understanding of what their students are studying. It would be easier to support the special ed. student in mainstreamed content areas."

Lack of planning led to ineffective use of another resource, staff. "A paraprofessional came into my room to assist a few LD math students who were not pulled out in a self-contained setting. Because it was not every day and she walked in "cold" each time it was not especially effective."

Selection of Service Delivery Model Based on Student Readiness

A final theme related to how teachers determine the appropriate service delivery model for students with LD. While the questions asked were related to strengths and recommendations for improvement, teachers frequently contextualized their responses by referencing student readiness. Comments indicated that the model should be selected to meet the needs of students and should be an individual decision but there seemed to be a focus on meeting student needs within certain achievement parameters rather than greater adjustments to models tailored to students.

Very often, if students were weak, the need for pullout was stated by teachers in both models. Statements included, "The 'pullout' or self-contained setting was best for the majority of these students because their instructional levels were significantly below that of the remainder of the group," "It's a strength to pull out students who have disabilities which prevent them from keeping pace with their general education peers," and "If the student was way below grade level in reading, a resource room that could address phonics instruction would be a better fit for reading progress."

Co-teaching was identified as an alternative for students who were on or near grade level in fourteen quotes from teachers. Teachers noted that students should be ready for the general education class in statements such as, "If a student is slightly behind, co-teaching works well," and "If they [students with LD] are working on or very near grade level and mostly need accommodations and modifications collab. is more appropriate."

Beyond accommodations and modifications in general education classes, there seemed to be a strong desire to maintain the status quo. If student success required more

than accommodations and modifications, the general education setting was not considered the appropriate setting. Several teachers noted that a strength of pullout was eliminating the need to change, using statements such as, "Students with special needs need more individualized instruction that is difficult to do within the regular classroom," "It also relieves the general education teacher from making modifications to teacher the wide range of learning abilities," "Children with specific L. D. problems left the class for language arts and math. I was able to teach the curriculum without modification."

Quantified Program Efficacy

Question 3: Do teachers perceive differential impact of their current model on groups of students with and without LD in their classrooms?

Descriptive statistics are provided for teacher responses to Likert-scale items related to performance for students with LD and their peers. Further analysis was not pursued due to limited sample size. Teacher ratings for students with LD and without disabilities, not disaggregated by service delivery model, were similar on all items except progress in mastering the SOL. That is, teachers rated students with LD as mastering the SOL at a lower level than students without disabilities (the mean score for students with LD was more than one standard deviation below the rating for students without disabilities). Comparison of ratings by model without disaggregating for student type yielded no mean differences equal to or greater than one standard deviation (see Tables H1 and H2 in Appendix H).

Table 7

Mean Response for Teacher Perceptions of Student Performance by Student Type/Model

Student Performance	Student*Model	Mean	SD
Academic Progress	SWLD – R	4.50	.82
	SWLD – CT	5.57	
	SWOD – R	5.38	
	SWOD – CT	5.64	
Mastery of SOL	SWLD – R	3.42	1.37
	SWLD – CT	4.50	
	SWOD – R	5.14	
	SWOD – CT	5.71	
Effective Study Skills	SWLD – R	3.75	1.11
	SWLD – CT	4.36	
	SWOD – R	4.75	
	SWOD – CT	5.14	
Homework Completion	SWLD – R	4.08	1.13
	SWLD – CT	4.64	
	SWOD – R	4.88	
	SWOD – CT	5.14	
Classwork Completion	SWLD-R	4.83	.96
	SWLD - CT	5.00	
	SWOD – R	5.50	
	SWOD - CT	5.50	
Class Participation	SWLD-R	4.58	.82
	SWLD – CT	5.21	
	SWOD – R	5.38	
	SWOD – CT	5.43	
Motivation	SWLD-R	4.25	.84
	SWLD – CT	5.07	
	SWOD – R	4.75	
	SWOD – CT	5.29	

to be continued

Table 7 (cont.)

Mean Response for Teacher Perceptions of Student Performance by Student Type/Model

Student Performance	Student*Model	Mean	SD
Behavior	SWLD-R	4.75	.74
	SWLD - CT	5.07	
	SWOD – R	4.63	
	SWOD - CT	5.21	
Social Skills	SWLD-R	4.58	.80
	SWLD - CT	5.07	
	SWOD – R	5.00	
	SWOD - CT	5.29	
Regular Attendance	SWLD-R	5.50	.59
	SWLD - CT	5.79	
	SWOD – R	5.63	
	SWOD - CT	5.71	

Note. 1 = disagree, strongly, 6 = agree strongly; R = resource model; CT = co-teaching model; SWLD = students with learning disabilities; SWOD = students without disabilities

The mean responses for efficacy items are presented for students with LD and without disabilities by model in Table 7. The percentage of teachers completing each item ranged from 70.0% to 86.7%, including the two surveys that were not returned. While not statistically significant, it is notable that the means for students in co-taught classrooms are greater than or equal to those for students in the same category in the resource model. Also, students with LD in co-taught classes received higher ratings than students without disabilities in the resource model for 50% of the items. The differences are less than one standard deviation with the exception of academic progress for students with LD in co-taught classrooms who received a mean rating greater than one standard

deviation compared to students with LD in resource rooms. Appendix H contains additional detail on these items. Statistics reported include percentages, means, standard deviations and medians.

Participation of Students with LD in Standardized Testing

Question 4: What percentage of all students with learning disabilities in the selected classrooms was: (a) exempted from standardized testing; (b) tested with modification; and (c) tested using standard administration?

Statistics calculated include percentages for each of the three listed categories for co-taught versus resource room. All students with LD in participating classrooms were included in SOL testing, but two students in co-taught settings were exempt for particular tests: One student was exempt from English and another was exempt from English and writing. Participation rates in SOL testing by model for students with LD are listed in Table 8.

Table 8

SOL Participation: Testing with Accommodations/Modifications and Exemption Percentages for Students With LD by Model

	Resource Room	Co-Taught
Total students with LD	26	26
Percentage exempt from at least one SOL test	0.0%	7.6%
Percentage tested with accommodations/modifications	88.0%	90.2%
Percentage tested using standard administration	12.0%	7.7%

Table 9 presents the observed frequencies for type of model and exemption from SOL testing. With alpha set at .10, a chi-square test on these frequencies was not statistically significant, χ^2 (2, N = 52) = 2.080, p = .353. Students with LD in resource room or co-taught models were exempt from testing at similar rates.

Table 9

Observed Frequencies of SOL Test Exemptions for Students with LD by Model

			Model		Total
			Resource	Co-Teaching	
Exempt Sped	No exemption	Count	26	24	50
		% within Exempt Sped	52.0%	48.0%	100.0%
		% within Model	100.0%	92.3%	96.2%
	Reading & Writing	Count		1	1
		% within Exempt Sped		100.0%	100.0%
		% within Model		3.8%	1.9%
	Writing	Count		1	1
		% within Exempt Sped		100.0%	100.0%
		% within Model		3.8%	1.9%
Total		Count	26	26	52
		% within Exempt Sped	50.0%	50.0%	100.0%
		% within Model	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.080(a)	2	.353
Likelihood Ratio	2.853	2	.240
Linear-by-Linear Association	1.829	1	.176
N of Valid Cases	52		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .50.

Table 10 presents the observed frequencies for type of model and SOL administration with accommodations. With alpha set at .10, a chi-square test on these frequencies was not statistically significant, χ^2 (1, N = 51) = 2.67, p > .605. Students with LD in resource room and co-taught models took the SOL Tests with similar frequencies of accommodations.

Table 10

Observed Frequencies of SOL Test Accommodations for Students with LD by Model

			Model		Total
			Resource	Co-Teaching	
Accommodations	0	Count	3	2	5
		% within Accommodations	60.0%	40.0%	100.0%
		% within Model	12.0%	7.7%	9.8%
	1	Count	22	24	46
		% within Accommodations	47.8%	52.2%	100.0%
		% within Model	88.0%	92.3%	90.2%
Total		Count	25	26	51
		% within Accommodations	49.0%	51.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.267(b)	1	.605		
Continuity Correction(a)	.002	1	.963		
Likelihood Ratio	.269	1	.604		
Fisher's Exact Test				.668	.481
Linear-by-Linear Association	.262	1	.609		
N of Valid Cases	51				
a Computed only for a 2x2 table.					
b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.45.					

Student Performance on the Standards of Learning Tests

Student performance, as measured by pass rates and scaled scores on the SOL Tests, was the primary focus of hypothesis testing in this study.

SOL Test Performance for Students with LD

$H1_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for third- and fifth-grade students with learning disabilities in co-taught general education and pullout special education resource classrooms.

Prior to performing the statistical analysis for Hypothesis 1, several additional analyses were conducted to determine whether any identifiable differences existed for students with LD within the two models. First, gender, ethnicity, and grade level were compared using chi-square tests. With alpha set at .10, chi-square tests on these frequencies were not statistically significant, χ^2 (1, N = 52) = .325, $p > .569$, χ^2 (2, N = 51) = .1.147, $p = .564$ and χ^2 (1, N = 52) = 1.209, $p = .271$ for gender, ethnicity, and grade level, respectively. Further, ANOVAs and a MANOVA were performed using third-grade composite scores from the Stanford-9 TA, years retained, minutes of special education service per week, and years in special education. Again, there were no significant differences in student composition between the two models based on these analyses. Results of the analyses may be found in Appendix C on Tables C5 through C7.

To address Hypothesis 1, pass rates for SOL Tests were calculated with scaled scores less than 400 identified as failing. Writing and technology tests are not administered at the third grade level, and this is reflected in the reduced sample sizes for these tests. The exemptions for writing and English also decreased sample size. With

alpha set at .10, no significant difference in pass rates was found for students with LD served by the two models for English, writing, history and social sciences, science, and technology. Table 11 summarizes the results of chi-squares for each SOL Test and Table 12 provides frequency distributions by test. The null hypothesis $H1_0$ was not rejected for pass rates.

Table 11

Summary of Chi-Squares for SOL Comparing Test Pass Rates for Students With LD by Model

SOL Test	*df*	Sample Size	Chi-Square	Significance
English	1	51	1.695	.193
Writing	1	42	.573	.449
History & Social Science	1	52	.000	1.000
Science	1	52	.843	.358
Technology	1	43	.321	.571

Table 12

Frequency Distributions for SOL Test Pass Rates for Students With LD by Model

		Model		Total
		Resource	Co-Teaching	
SOLEnglishPass	Fail	6	10	16
	%	37.5%	62.5%	31.4%
	Pass	20	15	35
	%	76.9%	60.0%	68.6%
Total		26	25	51
SOLWritingPass	Fail	2	4	6
	%	10.0%	18.2%	14.3%
	Pass	18	18	36
	%	90.0%	81.8%	85.7%
Total		20	22	42
SOLHistoryPass	Fail	13	13	26
	%	50%	50%	50%
	Pass	13	13	26
	%	50%	50%	50%
Total		26	26	52
SOLSciencePass	Fail	6	9	15
	%	23.1%	34.6%	28.8%
	Pass	20	17	37
	%	76.9%	65.4%	71.2%
Total		26	26	52
SOL Technology Pass	Fail	3	5	8
	%	15.0%	21.7%	18.6%
	Pass	17	18	35
	%	85.0%	53.5%	81.4%
Total		20	23	43

To compare scaled scores, a MANOVA was performed using scores for fifth graders in English, writing, history and social science, science, and technology. Fifth-grade math scores were not included due to missing data for this test in several classes. Similarly, third-grade scores were not included in this analysis due to lack of testing in

writing and technology. Since the MANOVA only includes cases for which all variables are present, third graders would not have been included. The sample size would have been too restricted to perform a separate MANOVA for third-grade students with LD.

A MANOVA was performed for scaled scores for fifth-grade students in English, writing, science, technology, and history and social studies. With alpha set at .10, a 2 (Model) X 1 (Students with LD) multivariate analysis of variance revealed no statistically significant multivariate main effect for Model [Wilk's Λ = .004 F (10, 181) = 1817.603, $\underline{p}$ = .184]. Since the analysis only included students with LD, there were no interactions. Based on the MANOVA analysis, the null hypothesis $\underline{H}1_0$ was not rejected for scaled scores. Tables 13 and 14 provide a summary of the descriptive statistics for SOL test scaled scores for students with LD and the MANOVA analysis for Hypothesis 1.

Table 13

Descriptive Statistics for SOL Scaled Scores for Fifth-Grade Students With LD

Between-Subjects Factors

		Value Label	N
Model	1	Resource	20
	3	Co-Teaching	22

	Model	Mean	Std. Deviation	N
SOL English	Resource	433.35	46.40	20
	Co-Teaching	413.41	44.10	22
	Total	422.90	45.78	42
SOL Writing	Resource	441.10	39.42	20
	Co-Teaching	419.59	30.30	22
	Total	429.83	36.17	42
SOL Science	Resource	430.10	53.82	20
	Co-Teaching	417.86	41.98	22
	Total	423.69	47.78	42
SOL Technology	Resource	450.25	50.66	20
	Co-Teaching	430.86	38.45	22
	Total	440.10	45.20	42
SOL History	Resource	404.20	33.97	20
	Co-Teaching	407.00	39.52	22
	Total	405.67	36.56	42

Table 14

General Linear Model (MANOVA) for SOL Scaled Scores for Fifth-Grade Students With LD

Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.996	1817.603(a)	5.000	36.000	.000	.996
	Wilks' Lambda	.004	1817.603(a)	5.000	36.000	.000	.996
	Hotelling's Trace	252.445	1817.603(a)	5.000	36.000	.000	.996
	Roy's Largest Root	252.445	1817.603(a)	5.000	36.000	.000	.996
MODEL	Pillai's Trace	.182	1.606(a)	5.000	36.000	.184	.182
	Wilks' Lambda	.818	1.606(a)	5.000	36.000	.184	.182
	Hotelling's Trace	.223	1.606(a)	5.000	36.000	.184	.182
	Roy's Largest Root	.223	1.606(a)	5.000	36.000	.184	.182
a Exact statistic.							
b Design: Intercept+MODEL.							

SOL Test Performance Disaggregated by Achievement Level

$H2_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for fifth-grade students identified as below-average, average, or above-average in general education classrooms with co-teaching or without co-teaching.

Prior to performing analyses required for the remaining hypotheses, chi-square analyses and ANOVAs were performed to identify differences between students in the two groups on other variables. No statistically significant between-group differences were identified for gender, Stanford-9 TA composite scores, ethnicity, or numbers of students with disabilities in the classrooms (see Table C8).

A log-linear model was used to analyze pass rates for subgroups. Of the total sample size of 197, three to five cases were rejected for missing data due to exemptions or absence on the days of testing. Table 15 summarizes the results of the log-linear analyses. With alpha set at .10, student level accounted for most of the variance in pass/fail rates on all the SOL tests with the exception of history and social science, where the interaction of level and model was needed to maintain the goodness of fit for the statistical model generated. The null hypothesis could not be rejected for English, writing, science, and technology SOL tests due to the lack of a statistical difference in pass/fail rates between students in classes with resource rooms or co-teaching models.

Table 15

Summary of Log-linear Analysis of Fifth-Grade SOL Pass Rates by Student Level and Model

SOL Test	Independent Variables	n	df	Chi-Square	Significance
English	Student Level	193	3	3.9741	.2643
	Model	193	5	42.6698	.0000**
Writing	Student Level	192	3	1.1198	.7723
	Model	192	4	12.6651	.0130*
History	Student Level	193	5	42.6698	.0000**
	Model	193	5	42.6454	.0000**
Science	Student Level	193	3	2.3734	.4986
	Model	193	4	28.0848	.0000**
Technology	Student Level	194	3	.3722	.9459
	Model	194	4	19.1108	.0007**

* $p < .05$; ** $p < .001$.

Table 16 provides a followup analysis of the interaction between model and level noted for history and social science. All students in the above-average group passed the history SOL test in both service delivery models. Students classified as below-average

passed at slightly higher rates within a resource model whereas students classified as average passed at slightly higher rates in a co-teaching model.

Table 16

Followup for Significant Interaction of Model and Level for History and Social Science SOL Observed Percentage of Pass Rates

Student Level	Resource	Co-Teaching
Below-Average		
Pass	54.29%	50.00%
Fail	45.71%	50.00%
Average		
Pass	78.57%	79.41%
Fail	21.43%	20.59%
Above-Average		
Pass	100.00%	100.00%
Fail	0.00%	0.00%

A MANOVA was used to analyze scaled scores. A 2 (Model) X 3 (Level) multivariate analysis of variance revealed no statistically significant multivariate interaction effect, a significant multivariate main effect for Level [Wilk's $\Lambda = .466$ $F(10, 181) = 16.835$, $p < .0001$], and no significant multivariate main effect for Model [Wilk's $\Lambda = .952$ $F(10, 181) = 1.8115$, $p = .113$]. The difference in SOL test scaled scores was significantly affected by student level derived from third- or fourth-grade Stanford-9 TA composite scores. Model or the interaction of model and student level did not explain differences in student scores. Therefore, the null hypothesis for scaled scores in Hypothesis 2 cannot be rejected. Table 17 provides details for this MANOVA.

Table 17

General Linear Model (MANOVA) for Fifth Grade by Previous Performance Level and Model

		Value Label	N
Model	1	Resource	97
	3	Co-Teaching	94
Student level	1.00	Below-Average	65
	2.00	Average	60
	3.00	Above-Average	66

Multivariate Tests(c)

Effect		Value	F	H df	Error df	Sig.
Intercept	Pillai's Trace	.997	12497.852(a)	5.000	181.000	.000
	Wilks' Lambda	.003	12497.852(a)	5.000	181.000	.000
	Hotelling's Trace	345.245	12497.852(a)	5.000	181.000	.000
	Roy's Largest Root	345.245	12497.852(a)	5.000	181.000	.000
MODEL	Pillai's Trace	.048	1.811(a)	5.000	181.000	.113
	Wilks' Lambda	.952	1.811(a)	5.000	181.000	.113
	Hotelling's Trace	.050	1.811(a)	5.000	181.000	.113
	Roy's Largest Root	.050	1.811(a)	5.000	181.000	.113
STUDLEVE	Pillai's Trace	.538	13.412	10.000	364.000	.000
	Wilks' Lambda	.466	16.835(a)	10.000	362.000	.000
	Hotelling's Trace	1.137	20.465	10.000	360.000	.000
	Roy's Largest Root	1.129	41.079(b)	5.000	182.000	.000
MODEL * STUDLEVE	Pillai's Trace	.066	1.236	10.000	364.000	.266
	Wilks' Lambda	.935	1.229(a)	10.000	362.000	.270
	Hotelling's Trace	.068	1.223	10.000	360.000	.275
	Roy's Largest Root	.038	1.377(b)	5.000	182.000	.235

a Exact statistic.

b The statistic is an upper bound on F which yields a lower bound on the significance level.

c Design: Intercept+MODEL+STUDLEVE+MODEL * STUDLEVE .

Aggregated SOL Test Performance

$H3_O$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for the aggregate of

students by model of special education service delivery available for students with LD in the classroom.

To address pass rates for the aggregate of students, chi-square analyses were performed. Third- and fifth-grade scores were included in the analysis of pass rates for English, history and social science, and science. Scores for all three tests were available for 98.1% of students sampled. With alpha set at .10, no statistically significant difference was found in pass rates for students by model and the null hypothesis $H3_O$ could not be rejected for pass rates for the three content areas analyzed. Table 18 summarizes the results of chi-squares for each SOL Test and Table 19 provides frequency distributions by test.

Table 18

Summary of Chi-Squares for SOL Test Pass Rates for Third- and Fifth-grade Students by Model

SOL Test	*df*	Sample Size	Chi-Square	Significance
English	1	313	.001	.980
History & Social Science	1	313	.002	.968
Science	1	313	.157	.692

Table 19

Frequency Distributions for SOL Test Pass Rates for Third- and Fifth-Grade Students by Model

		Model		Total
		Resource	Co-Teaching	
SOLEnglishpass	Fail	32	22	54
	Pass	153	106	259
Total		185	128	313
SOLHistorypass	Fail	43	30	73
	Pass	142	98	240
Total		185	128	313
SOLSciencepass	Fail	26	16	42
	Pass	159	112	271
Total		185	128	313

The math test was analyzed for third grade only due to missing data at fifth grade. Table 20 contains the frequencies of pass/fail scores by model with 98.1% of third-grade scores complete for mathematics. With alpha set at .10, a chi-square test on these frequencies were not statistically significant [χ^2 (1, $\underline{N}$ = 92) = .033, $\underline{p}$ = .855] and the null hypothesis $\underline{H}3_O$ could not be rejected for third-grade math.

Table 20

Frequency Distributions for SOL Mathematics Test Pass Rates for Third-Grade Students by Model

		Model		Total
		Resource	Co-Teaching	
SOLMathpass	Fail	13	5	18
	Pass	55	19	74
Total		68	24	92

A final analysis of pass/fail rates was performed for the fifth-grade administration of the SOL writing and technology tests. With alpha set at .10, no statistically significant difference was found in pass rates for students by model and the null hypothesis $H3_O$ could not be rejected for pass rates for these two content areas. Table 21 summarizes the results of chi-squares for each SOL Test and Table 22 provides frequency distributions by test.

Table 21

Summary of Chi-Squares for SOL Test Pass Rates for Fifth-Grade Students by Model

SOL Test	*df*	Sample Size	Chi-Square	Significance
Writing	1	219	.027	.871
Technology	1	222	.620	.421

Table 22

Frequency Distributions for SOL Test Pass Rates for Third- and Fifth-Grade Students by Model

		Model		Total
		Resource	Co-Teaching	
SOLWritingpass	Fail	5	5	10
	Pass	110	99	209
Total		115	104	219
SOLTechnologypass	Fail	5	7	12
	Pass	112	98	210
Total		117	105	222

To address the scaled score component of Hypothesis 3, a MANOVA was performed using scaled scores for all SOL Tests administered at the fifth-grade level. A 2 (Model) X 5 (Test) multivariate analysis of variance revealed no statistically significant multivariate main effect for Model [Wilk's $\Lambda = .963$ $F(213, 219) = 1.631$, $p = .153$]. The null hypothesis $H3_0$ was not rejected. Table 23 provides a detailed summary of the MANOVA analysis.

Table 23

General Linear Model (MANOVA) for SOL Scaled Scores for Fifth-Grade Students by Model

		Value Label	N
Model	1	Resource	116
	3	Co-teaching	103

Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.994	6904.043(a)	5.000	213.000	.000	.994
	Wilks' Lambda	.006	6904.043(a)	5.000	213.000	.000	.994
	Hotelling's Trace	162.067	6904.043(a)	5.000	213.000	.000	.994
	Roy's Largest Root	162.067	6904.043(a)	5.000	213.000	.000	.994
MODEL	Pillai's Trace	.037	1.631(a)	5.000	213.000	.153	.037
	Wilks' Lambda	.963	1.631(a)	5.000	213.000	.153	.037
	Hotelling's Trace	.038	1.631(a)	5.000	213.000	.153	.037
	Roy's Largest Root	.038	1.631(a)	5.000	213.000	.153	.037

a Exact statistic.

b Design: Intercept+MODEL.

To summarize the results of testing for Hypothesis 3, no statistical differences between the performance of students with and without disabilities in pass rates or scaled scores on the SOL Tests were identified when special education service delivery models were compared. The null hypothesis could not be rejected.

Correlation Between Stanford-9 TA and SOL Test Performance

While not directly related to the comparison of service delivery models, data collected from prior standardized assessments to identify subgroups of students and to verify comparability of classrooms allowed further analysis. The relationship between Stanford-9 TA and SOL Test performance was explored to help inform decisions based on previous testing that targets students for remediation. Third graders in this study did not participate in any standardized testing prior to the spring of their third grade year, concurrent with SOL Tests. Therefore, subgroups could not be identified.

$H4_O$: There will be no significant relationship ($p \leq .05$) between student performance as demonstrated by scaled scores on the fifth-grade Virginia SOL Tests and the same students' performance on prior achievement testing when disaggregated by subgroups of LD, below-average, average, and above-average.

Separate Pearson Correlations were performed for each achievement group. Tables 24, 25, 26, and 27 provide statistical analyses. For students with LD, the relationship between third- or fourth-grade Stanford-9 TA composite scores and the six SOL tests administered at the fifth-grade level was statistically significant with $p \leq .001$ (2-tailed test) and r ranging from .530 for history and social science to .669 for mathematics. The strength of these correlations was in the moderate range as reflected by a coefficient of determination (r^2) of .28 for history and social science to $r^2 = .448$ for mathematics. In other words, the amount of variance shared by the Stanford-9 TA and SOL Tests for individual students identified as below-average ranged from approximately 28% to 45%. The null hypothesis was rejected, indicating a statistically significant relationship between the third grade and fifth grade testing for students with LD.

For students identified as below-average, the relationship between third- or fourth-grade Stanford-9 TA composite scores and the six SOL tests administered at the fifth-grade level was statistically significant with p ranging from .038 to .000 (2-tailed test) and r ranging from .258 for science to .552 for writing. The strength of these correlations ranged from weak, as reflected by a coefficient of determination (r^2) of .067 for science, to moderate for writing, $r^2 = .304$. In other words, the amount of variance shared by the Stanford-9 TA and SOL Tests for individual students identified as below-average ranged from approximately 7% to 30%. The null hypothesis was rejected, indicating a statistically significant relationship between the third- and fifth-grade testing for students identified as below-average.

For students identified as above-average, the relationship between third- or fourth-grade Stanford-9 TA composite scores and the six SOL was statistically significant with the exception of writing ($p = .076$). For other tests, p ranged from .038 to .001 (2-tailed test) whereas r ranged from .256 for science to .517 for mathematics. The strength of these correlations ranged from weak, as reflected by a coefficient of determination (r^2) of .067 for science, to moderate for mathematics, $r^2 = .267$. In other words, the amount of variance shared by the Stanford-9 TA and SOL Tests for individual students identified as above-average ranged from approximately 7% to 26%. The null hypothesis was rejected for all SOL Tests except writing, indicating a statistically significant relationship between the third- and fifth-grade testing for students identified as above-average.

For students identified as average, the relationship between third- or fourth-grade Stanford-9 TA composite scores and the six SOL was only statistically significant for history and social science ($p = .024$, $r = .286$, $r^2 = .081$). The strength of this correlation

was weak, with only 8% of variance shared by the Stanford-9 TA and SOL Tests for individual students identified as average. The null hypothesis was rejected only for history and social science for this group.

Table 24

Correlations Between Previous Stanford-9 TA Composite Scores and SOL Tests for Students With LD

Correlations								
		S-9 Comp	SOL English	SOL Writing	SOL Science	SOL Technol-ogy	SOL History	SOL Math
S-9 Comp	Pearson Correlation	1.000	.592(**)	.612(**)	.609(**)	.608(**)	.530(**)	.669(**)
	Sig. 2-tailed	.	.000	.000	.000	.000	.001	.000
	N	38	37	37	38	38	38	32
SOL English	Pearson Correlation	.592(**)	1.000	.288	.612(**)	.749(**)	.599(**)	.557(**)
	Sig. 2-tailed	.000	.	.065	.000	.000	.000	.000
	N	37	51	42	51	42	51	45
SOL Writing	Pearson Correlation	.612(**)	.288	1.000	.255	.202	.181	.461(**)
	Sig. 2-tailed	.000	.065	.	.102	.199	.250	.005
	N	37	42	42	42	42	42	36
SOL Science	Pearson Correlation	.609(**)	.612(**)	.255	1.000	.644(**)	.671(**)	.536(**)
	Sig. 2-tailed	.000	.000	.102	.	.000	.000	.000
	N	38	51	42	52	43	52	45
SOL Technol-ogy	Pearson Correlation	.608(**)	.749(**)	.202	.644(**)	1.000	.589(**)	.511(**)
	Sig. 2-tailed	.000	.000	.199	.000	.	.000	.001
	N	38	42	42	43	43	43	36
SOL History	Pearson Correlation	.530(**)	.599(**)	.181	.671(**)	.589(**)	1.000	.291
	Sig. 2-tailed	.001	.000	.250	.000	.000	.	.052
	N	38	51	42	52	43	52	45
SOL Math	Pearson Correlation	.669(**)	.557(**)	.461(**)	.536(**)	.511(**)	.291	1.000
	Sig. 2-tailed	.000	.000	.005	.000	.001	.052	.
	N	32	45	36	45	36	45	45
** Correlation is significant at the 0.01 level (2-tailed).								

Table 25

Correlations Between Previous Stanford-9 TA Composite Scores and SOL Tests for Students Identified as Below-Average

Correlations								
		S-9 Comp	SOL English	SOL Writing	SOL Science	SOL Technol.	SOL History	SOL Math
S-9 Comp	Pearson Correlation	1.000	.380(**)	.552(**)	.258(*)	.324(**)	.273(*)	.337(*)
	Sig. 2-tailed	.	.002	.000	.038	.009	.028	.010
	N	66	65	65	65	65	65	57
SOL English	Pearson Correlation	.380(**)	1.000	.380(**)	.440(**)	.558(**)	.419(**)	.414(**)
	Sig. 2-tailed	.002	.	.002	.000	.000	.001	.001
	N	65	65	65	65	65	65	57
SOL Writing	Pearson Correlation	.552(**)	.380(**)	1.000	.289(*)	.278(*)	.243	.341(**)
	Sig. 2-tailed	.000	.002	.	.020	.025	.052	.009
	N	65	65	65	65	65	65	57
SOL Science	Pearson Correlation	.258(*)	.440(**)	.289(*)	1.000	.480(**)	.530(**)	.467(**)
	Sig. 2-tailed	.038	.000	.020	.	.000	.000	.000
	N	65	65	65	65	65	65	57
SOL Technol.	Pearson Correlation	.324(**)	.558(**)	.278(*)	.480(**)	1.000	.338(**)	.411(**)
	Sig. 2-tailed	.009	.000	.025	.000	.	.006	.001
	N	65	65	65	65	65	65	57
SOL History	Pearson Correlation	.273(*)	.419(**)	.243	.530(**)	.338(**)	1.000	.428(**)
	Sig. 2-tailed	.028	.001	.052	.000	.006	.	.001
	N	65	65	65	65	65	65	57
SOL Math	Pearson Correlation	.337(*)	.414(**)	.341(**)	.467(**)	.411(**)	.428(**)	1.000
	Sig. 2-tailed	.010	.001	.009	.000	.001	.001	.
	N	57	57	57	57	57	57	57
** Correlation is significant at the 0.01 level (2-tailed).								
* Correlation is significant at the 0.05 level (2-tailed).								

Table 26

Correlations Between Previous Stanford-9 TA Composite Scores and SOL Tests for Students Identified as Average

Correlations								
		S-9 Comp	SOL English	SOL Writing	SOL Science	SOL Technol-ogy	SOL History	SOL Math
S-9 Comp	Pearson Correlation	1.000	.192	.159	.212	.143	.286(*)	.180
	Sig. 2-tailed	.	.139	.225	.099	.269	.024	.226
	N	64	61	60	62	62	62	47
SOL English	Pearson Correlation	.192	1.000	.137	.471(**)	.334(**)	.342(**)	.272
	Sig. 2-tailed	.139	.	.297	.000	.009	.007	.064
	N	61	61	60	61	61	61	47
SOL Writing	Pearson Correlation	.159	.137	1.000	-.136	.223	-.119	-.087
	Sig. 2-tailed	.225	.297	.	.301	.086	.365	.567
	N	60	60	60	60	60	60	46
SOL Science	Pearson Correlation	.212	.471(**)	-.136	1.000	.290(*)	.434(**)	.526(**)
	Sig. 2-tailed	.099	.000	.301	.	.022	.000	.000
	N	62	61	60	62	62	62	47
SOL Technol-ogy	Pearson Correlation	.143	.334(**)	.223	.290(*)	1.000	.309(*)	.332(*)
	Sig. 2-tailed	.269	.009	.086	.022	.	.014	.022
	N	62	61	60	62	62	62	47
SOL History	Pearson Correlation	.286(*)	.342(**)	-.119	.434(**)	.309(*)	1.000	.571(**)
	Sig. 2-tailed	.024	.007	.365	.000	.014	.	.000
	N	62	61	60	62	62	62	47
SOL Math	Pearson Correlation	.180	.272	-.087	.526(**)	.332(*)	.571(**)	1.000
	Sig. 2-tailed	.226	.064	.567	.000	.022	.000	.
	N	47	47	46	47	47	47	47
* Correlation is significant at the 0.05 level (2-tailed).								
** Correlation is significant at the 0.01 level (2-tailed).								

Table 27

Correlations Between Previous Stanford-9 TA Composite Scores and SOL Tests for Students Categorized as Above-Average

Correlations								
		S-9 Comp	SOL English	SOL Writing	SOL Science	SOL Technol-ogy	SOL History	SOL Math
S-9 Comp	Pearson Correlation	1.000	.365(**)	.219	.256(*)	.345(**)	.409(**)	.517(**)
	Sig. 2-tailed	.	.002	.076	.038	.004	.001	.001
	N	67	67	67	66	67	66	37
SOL English	Pearson Correlation	.365(**)	1.000	.381(**)	.370(**)	.288(*)	.361(**)	.182
	Sig. 2-tailed	.002	.	.001	.002	.018	.003	.281
	N	67	67	67	66	67	66	37
SOL Writing	Pearson Correlation	.219	.381(**)	1.000	.142	-.126	.155	.007
	Sig. 2-tailed	.076	.001	.	.255	.311	.213	.966
	N	67	67	67	66	67	66	37
SOL Science	Pearson Correlation	.256(*)	.370(**)	.142	1.000	.390(**)	.304(*)	.219
	Sig. 2-tailed	.038	.002	.255	.	.001	.013	.193
	N	66	66	66	66	66	66	37
SOL Technol-ogy	Pearson Correlation	.345(**)	.288(*)	-.126	.390(**)	1.000	.282(*)	.273
	Sig. 2-tailed	.004	.018	.311	.001	.	.022	.102
	N	67	67	67	66	67	66	37
SOL History	Pearson Correlation	.409(**)	.361(**)	.155	.304(*)	.282(*)	1.000	.604(**)
	Sig. 2-tailed	.001	.003	.213	.013	.022	.	.000
	N	66	66	66	66	66	66	37
SOL Math	Pearson Correlation	.517(**)	.182	.007	.219	.273	.604(**)	1.000
	Sig. 2-tailed	.001	.281	.966	.193	.102	.000	.
	N	37	37	37	37	37	37	37
** Correlation is significant at the 0.01 level (2-tailed).								
* Correlation is significant at the 0.05 level (2-tailed).								

$H5_O$: There will be no significant relationship ($p \leq .05$) between the aggregate student performance as demonstrated by scaled scores on the Virginia SOL Tests and the same students' prior standardized test performance.

For Hypothesis 5, a Pearson correlation coefficient was calculated for the total sample of fifth-grade students (N=141 to N=194). Table 28 contains the results of the analysis. The relationship between the third- or fourth-grade Stanford-9 TA composite score and the six SOL tests administered at the fifth-grade level was statistically significant at the 0.01 level (2-tailed test), with r ranging from .562 for math to .645 for English. The strength of these correlations would be considered moderate. Coefficients of determination (r^2) ranged from .316 for math to .416 for English. In other words, the amount of variance shared by the Stanford-9 TA and SOL Tests for individual students ranged from approximately 32% to 42%. The null hypothesis was rejected, indicating a statistically significant relationship between the third- and fifth-grade testing.

Table 28

Correlational Data for Third- or Fourth-Grade Stanford-9 TA and Fifth-Grade SOL Tests

		S-9 Comp	SOL English	SOL Writing	SOL Science	SOL Technol-ogy	SOL History	SOL Math
S-9 Comp	Pearson Correlation	1.000	.645(**)	.614(**)	.565(**)	.584(**)	.604(**)	.562(**)
	Sig. 2-tailed	.	.000	.000	.000	.000	.000	.000
	N	197	193	192	193	194	193	141
SOL English	Pearson Correlation	.645(**)	1.000	.537(**)	.613(**)	.611(**)	.611(**)	.548(**)
	r^2	.416						
	Sig. 2-tailed	.000	.	.000	.000	.000	.000	.000
	N	193	222	220	221	222	221	167
SOL Writing	Pearson Correlation	.614(**)	.537(**)	1.000	.328(**)	.340(**)	.386(**)	.402(**)
	r^2	.377						
	Sig. 2-tailed	.000	.000	.	.000	.000	.000	.000
	N	192	220	220	219	220	219	165
SOL Science	Pearson Correlation	.565(**)	.613(**)	.328(**)	1.000	.558(**)	.595(**)	.541(**)
	r^2	.319						
	Sig. 2-tailed	.000	.000	.000	.	.000	.000	.000
	N	193	221	219	222	222	222	167
SOL Technol-ogy	Pearson Correlation	.584(**)	.611(**)	.340(**)	.558(**)	1.000	.552(**)	.555(**)
	r^2	.341						
	Sig. 2-tailed	.000	.000	.000	.000	.	.000	.000
	N	194	222	220	222	223	222	167
SOL History	Pearson Correlation	.604(**)	.611(**)	.386(**)	.595(**)	.552(**)	1.000	.635(**)
	r^2	.365						
	Sig. 2-tailed	.000	.000	.000	.000	.000	.	.000
	N	193	221	219	222	222	222	167
SOL Math	Pearson Correlation	.562(**)	.548(**)	.402(**)	.541(**)	.555(**)	.635(**)	1.000
	r^2	.316						
	Sig. 2-tailed	.000	.000	.000	.000	.000	.000	.
	N	141	167	165	167	167	167	167

** Correlation is significant at the 0.01 level (2-tailed).

Summary

This chapter presented the results of data collection for descriptive questions regarding teacher perceptions of program efficacy as well as statistical analyses related to student achievement on the Virginia Standards of Learning Tests for third- and fifth-grade students. The purpose of the statistical analyses was to determine the degree to which achievement outcome measures were affected by special education service delivery model. Based on the data presented in this chapter, the following findings were observed:

1. General education and special education teachers in co-taught classrooms reported frequencies of use for instructional arrangements that were similar to those of general education teachers without co-teaching in their classrooms. Possible differences existed when compared with the instructional arrangements used by special education resource room teachers. Teachers in resource rooms reported less use of whole-group instruction and independent practice and greater use of computer-assisted and differentiated instruction.
2. Open-ended questions were categorized into five themes, including instruction and teacher roles, student achievement, affective or social issues, resources, and selection of service delivery model based on student readiness.
    a. Teachers noted that both models allowed for greater one-to-one and small-group instruction.
    b. The introduction of strategy training in co-teaching classrooms was perceived as a benefit for all students in the class.

c. The majority of comments related to student achievement indicated that teachers perceived co-teaching as a more effective model. For students with LD the explanation for this preference was the existence of positive peer models and greater exposure to the general education curriculum.

d. Teachers in both models noted that strong teaching and interpersonal skills were important factors in the development of a strong program.

e. Co-teaching for students with LD was perceived as less stigmatizing than pullout.

f. The importance of and greater need for resources to support successful programs was a strong theme. The need for more special education staff for co-teaching and paraeducator support in general education classrooms and reductions in the ratio of students with disabilities in individual classrooms was frequently noted. The quantity of paperwork completed by special educators was a perceived stressor that teachers felt could be addressed with additional staff. Ongoing professional development and increases in planning time were recommended as ways to improve programs.

g. Teachers wrote of co-teaching as an appropriate model for students with LD who were at or near grade level. If students required curriculum or instruction different from what was offered in general education, a resource room placement was seen as more appropriate.

h. Co-teaching was described as a way to support accommodations and modifications to the general education curriculum. The resource room model was sometimes seen as a way to allow a general education teacher to continue teaching without making any adjustments.

i. Greater support for students with LD beyond the language arts and math instruction being provided was requested. General education teachers noted that support across content areas was needed for many students with LD.

3. Across models, teachers rated student progress for students with and without LD similarly with the exception of mastering the SOL, where students with LD were rated at a lower level than their peers. While sample size limits interpretation, teachers participating in co-teaching consistently rated performance for all students higher than teachers participating in a resource room model.
4. Students with LD participated in SOL testing at high rates in both models (greater than 90%) and received accommodations at similar rates across models (approximately 90%). There was no statistical difference between models on these rates.
5. There was no statistical difference in SOL Test pass rates for students with LD served in either resource rooms or co-taught classrooms. There was no statistical difference in SOL Test scaled scores for students with LD in either model.
6. When disaggregated by achievement groups, there was no statistical difference in SOL Test pass rates or scaled scores for students in classrooms served with a resource room or co-teaching model with one exception. An interaction between model and student level was observed for history and social sciences, with a slightly higher percentage of students identified as below-average passing in the resource model and a slightly higher percentage of students identified as average passing in the co-teaching model.

7. There was no statistically significant difference in pass rates or scaled scores on the SOL Tests by model for the aggregate of students served in classrooms with resource room or co-teaching models.
8. Third-grade composite scores on the Stanford-9 TA correlated significantly with scaled scores on SOL Tests for students with LD and students identified as below-average in the data set. All tests except writing correlated significantly for students identified as above-average. SOL scores for students identified as average did not correlate significantly with their third- or fourth-grade Stanford-9 TA scores on any tests except history and social science.
9. Third-grade composite scores on the Stanford-9 TA correlated significantly with scaled scores on SOL Tests for the aggregate of students. The strength of the correlation was moderate.

CHAPTER 5

IMPLICATIONS

The major purposes of this research study were to compare achievement for students with LD and their peers without disabilities using the Virginia Standards of Learning (SOL) Tests and teacher perceptions of efficacy between programs using pullout resource room or co-teaching models for delivery of special education services at the third- and fifth-grade level. Inclusion of students with special needs and standards-based reform with an emphasis on assessment and accountability are two reform agendas found at the intersection of general and special education today (McDonnell et al., 1997). In addition, research on the impact of inclusive programming and standards-based reform has been limited to date (Boudah et al., 1997; Crockett, 1997; Klingner et al., 1998).

Calls for inclusive services, concerns about the readiness of general education to accept and support students with learning disabilities, and school reform efforts confront today's educators and policy-makers. Students with LD comprise the largest percentage of students with disabilities, and organizations for individuals with LD have often been the most vocal in voicing concern about inclusive practices; therefore, the targeted disability for this study was learning disabilities. Information collected qualitatively from stakeholders of co-teaching such as teachers, administrators, students, and parents suggests that adjustments made for students with learning disabilities can be beneficial to all students, especially those experiencing difficulty (Gerber, 1996; Gerber & Popp

2000a; Walther-Thomas, 1997). However, the counter concern that meeting the needs of students with disabilities leads to a watered-down, slower-paced curriculum is voiced as well (Baker & Zigmond, 1995; Gerber, 1995; Shanker, 1995). Therefore, in addition to identifying differences between the two program models, differences in student achievement disaggregated by varying academic skill level were explored.

Review of the Literature

How closely the proposed reforms in both special education and general education align will influence the success of efforts to include students with learning disabilities effectively in general education curricula. At this intersection, shared goals must be identified and divergent goals reconciled. Information gleaned from research on the essential elements that increase success for all students is a critical component in such an analysis. Current research and theory suggest many common elements required to develop and implement effective programs for all students. Both the literature on effective schools (Bickel & Bickel, 1986; Butler & Dickson, 1997; Edmonds, 1982; Shields et al., 1995; Shields, Knapp, & Wechsler, 1995) and on inclusion (Gerber, 1996; Gerber & Popp, 1999; Gerber & Popp, 2000a & 2000b; Idol, 1997; King-Sears, 1997; Malloy & Lillie, 1997; Tindall, 1996; Walther-Thomas, 1997; Walther-Thomas et al., 2000) identify the need for a shared vision of education's purpose and high expectations for students with ongoing assessment and accountability measures. There has been a shift from procedural to substantive educational rights (Weintraub, 1997) in both arenas, and this shift is perceived as the means to achieve greater equity in educational opportunity for students. Inputs are no longer sufficient; the focus must include outcomes. Another common theme found across the general education and special education literature is the

importance of collegiality and collaboration among teachers coupled with ongoing professional development (Rossman et al., 1988; Shields et al., 1995; Wolery et al., 1995; Zahorik, 1987). Such commonalities offer many avenues for dialogue and the creation of effective service delivery models.

While much overlap can be identified, the current focus on increased expectations and accountability raises questions regarding how students with disabilities, many of whom have LD, can effectively participate in general education programs and how their participation may impact the learning of their peers (Baker, 1995; Bechard, 2000; Erickson, Ysseldyke, Thurlow, & Elliott, 1998; Grebenstein, 1995; McDonnell et al., 1997; O'Neil, 1995; Shanker, 1995; Vaughn & Schumm, 1996). To respond to such questions, further study is needed. Early studies of special education delivery systems do not reflect the current context within which services are provided and, therefore, have lost their applicability to current decision making (Shavelson, 1988). In addition, the existing research is limited and concerns have been raised regarding technical adequacy, such as the lack of clear descriptions of students and programs and limited sample sizes (McDonnell et al., 1997). The increasing stakes of accountability measures necessitate greater knowledge of the impact of service delivery models on the learning of all students in the system. Therefore, the following questions and hypotheses were explored.

Review of Hypotheses

The following descriptive questions were addressed by this study.

1. What instructional arrangements are employed, and how frequently, by third- and fifth-grade teachers in co-taught general education classrooms, general education without co-teaching, and pullout special education resource rooms?

2. What are teacher perceptions of the efficacy of the models they use to provide instruction, including what do teachers perceive as the greatest strengths of their current model and what changes would they make to improve the model?
3. Do teachers perceive differential impact of their current model on groups of students with and without LD in their classrooms and does this vary by model setting?
4. What percentage of all students with learning disabilities in the selected classrooms is: (a) exempt from standardized testing; (b) tested with modification; and (c) tested using standard administration?

The following null hypotheses were proposed for statistical analysis in this study.

$H1_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for third- and fifth-grade students with learning disabilities in co-taught general education and pullout special education resource classrooms.

$H2_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for fifth-grade students identified as below-average, average, or above-average in general education classrooms with co-teaching or without co-teaching.

$H3_0$: There will be no significant difference ($p \leq .10$) between student achievement as demonstrated by pass rates and scaled scores on SOL Tests for the aggregate of students by grade level based on the model of special education service delivery available for students with LD in the classroom.

$H4_0$: There will be no significant relationship ($p \leq .10$) between student performance as demonstrated by scaled scores on the fifth-grade Virginia SOL Tests and the same

students' performance on prior achievement testing when disaggregated by subgroups of LD, below-average, average, and above-average.

$H5_O$: There will be no significant relationship ($p \leq .05$) between the aggregate student performance as demonstrated by scaled scores on the Virginia SOL Tests and the same students' prior standardized test performance.

Review of Methods

Requests for permission to conduct this research study were made to four school divisions. Three moderate to large school divisions approved the study and central office personnel nominated potential sites for data collection based on the schools' reputation for having a strong co-teaching or resource room service delivery for students with LD. Subsequently, packets of information explaining the study with samples of the data collection instruments were mailed to principals at nominated schools. Through followup phone calls, principal interest in the study was determined. The principals shared the study materials with general and special education teachers who had worked together with a classroom of students at the third- or fifth-grade level, either as co-teachers or as the general education teacher working alone and the special education teacher working solely with students pulled out to a resource room for their IEP services.

Five schools in largely suburban areas participated and 23 teachers provided information representing a total of 16 classrooms. Seven special education teachers and 16 general education teachers completed questionnaires representing eight co-taught classrooms and eight general education classrooms having students with LD who received their special education services in pullout resource room settings. Three special education teachers completed surveys for single classrooms and four included

perceptions for two different classes. Two special education teachers, associated with two resource room classrooms each, did not return their questionnaires. Individual student data was provided for 14 classrooms of which eight experienced resource room support and six classrooms experienced co-teaching.

According to teacher report, there were 339 students in the 14 classrooms with individual student data. Data for analysis was available for 319 of these students. Missing data resulted from students who were absent on the days of testing, students who were no longer enrolled and whose records were not available, and students with disabilities who received special education services for more than 50% of the school day and were not the focus of this study. There were 26 students with LD, as identified by their IEPs, in each service delivery model. In addition, fifth-grade students were grouped into above-average, average, and below-average categories based on their third- or fourth-grade Stanford-9 TA composite scores. No statistically significant differences were found in student gender, ethnicity, or prior achievement by service delivery model, nor were there any statistically significant differences in the number of students with disabilities in the two models.

Division- and school-level information was obtained from the Virginia Department of Education website, including enrollment, budget information, school accreditation, and percentage of students receiving free and reduced cost lunch. Teachers were asked to complete questionnaires that included personal demographic data, a description of the special education service delivery employed in the classroom, Likert-scale items for use of instructional arrangements, Likert-scale items rating performance of students with LD and their peers without disabilities, and open-ended questions about strengths and

recommendations to improve the special education service delivery model being used. Central office personnel or a person identified by the school principal completed a spreadsheet to collect data for individual students within the participating classes. Spreadsheets were completed for 14 of the 16 classes. This information included age, gender, third- or fourth-grade Stanford-9 TA composite scores for fifth-grade students, special education service delivery employed in classrooms during the previous two years, and performance on the SOL Tests administered during the year targeted. For students with disabilities, disability classification, level of service in minutes per week, and the use of testing accommodations or exemptions were reported as well.

Comparisons of resource room and co-teaching models for student achievement and teacher perceptions were made using a variety of statistical analyses and qualitative processes. Treatment of the data included descriptive statistics, chi-squares, ANOVAs, MANOVAs, correlations, and log linear analyses. Open-ended questions were analyzed using qualitative methods to identify themes through reviewing, sorting, and grouping of responses.

Study Findings

Summary of Findings, Interpretation, and Literature Support

Possible differences were found in the frequency of using certain instructional arrangements, with special education resource room teachers indicating greater use of computer-assisted instruction and differentiated instruction and less use of whole-group instruction and independent practice when compared with either group of general educators or co-teaching special educators. These variations appear consistent with the traditional resource room approach whereby instruction is tailored to students' IEPs,

necessitating differentiation even within a small group and making whole-group instruction less likely. Also, a means of individualizing instruction when one teacher differentiates is computer-assisted instruction. Therefore, greater emphasis on direct instruction and the use of computer-assisted instruction as a method of providing independent practice in resource rooms may explain the differences in the frequency of independent practice reported.

Little difference was found in the instructional arrangements reported by teachers in co-teaching general education classes and classes without co-teaching. A major purpose for co-teaching and its development was to reshape the general education classroom to meet the needs of more students; namely, those with disabilities (Bauwens & Hourcade, 1991, 1995). In this study, teacher reports on the instructional arrangements used do not indicate that a significant change has occurred; however, a number of the general education classes without co-teaching had teachers who had co-taught in the past and both models were present in the school. With the current data, it would be difficult to eliminate the possibility that change *had* occurred and teachers were employing instructional arrangements based on previous experiences with co-teaching or proximity to classrooms where co-teaching was employed.

Perceptions of efficacy suggested that teachers generally preferred the co-teaching model to resource room services. The ability to problem solve with another professional and receive additional support within the classroom were noted frequently as teacher benefits. In turn, the lack of stigmatization, access to appropriate peer models, and the provision of strategy instruction were cited as student benefits.

Quantified measures of teachers' perceptions of student performance also suggested a preference for co-teaching and little difference within models between students with LD and students without disabilities. While the sample size was too small for statistical comparisons, a review of mean scores and standard deviations indicated that similar ratings were given for students with LD and students without disabilities. Only mastery of SOL was rated lower for students with LD in both models. Students with LD receiving resource room support also were rated lower on academic progress while little difference in academic progress was noted for either group of students in co-taught classes. Across indicators, co-teachers gave higher ratings to students with LD and students without disabilities than did general or special educators in the resource model.

This observation of co-teaching preference is inconsistent with the results of the statistical analyses of student SOL scores, where no statistically significant differences in student performance were identified. In addition, while not statistically significant, SOL scores were consistently higher for students with LD in resource settings. Several explanations for this discrepancy seem viable. First, the collegial nature of co-teaching may support a more positive view of the teaching/learning experience. As Zahorik (1987) noted, there is a "need to help teachers become less private about their classroom behaviors as a way to increase collegiality, improve instruction, and make teaching more rewarding" (p. 385). If co-teachers find teaching more rewarding, this may influence their perceptions of the students they serve. This explanation is supported by the teaching efficacy research as well (Ashton & Webb, 1986). If teachers believe their efforts make a difference and they have a colleague with whom to problem solve and share and who acknowledges those efforts and commitment, greater professional satisfaction is likely.

Second, students in resource settings, especially when both models are available, may have more significant needs. Comparing third- or fourth-grade Stanford-9 TA scores for fifth-grade students with LD did not reveal any statistically significant differences in achievement levels by model, but teachers' observations of student performance may lead them to select more restrictive placements and generate more extensive accommodations during testing than those provided for students remaining in general education classrooms. There was no statistically significant difference in the frequency of accommodations by model; however, data for some of the students included whether standard or nonstandard accommodations were made, although this was not requested. Nonstandard accommodations are permitted for SOL Tests, but provide greater support for the student and may impact what is being assessed. For example, reading aloud to a student during a reading comprehension test would be a nonstandard accommodation changing the skill assessed from reading comprehension to listening comprehension. A review of this additional information revealed that approximately four times as many students in resource rooms received nonstandard accommodations than students in co-taught settings. Therefore, it is possible that differences in scores may reflect the level of accommodation used rather than the achievement performance of students in the two models.

A third possible explanation for the difference in teacher ratings and SOL Test performance relates to the ability of SOL Tests to assess students' educational experience. The SOL Tests sample a set of content that can be assessed through traditional testing methods. Classroom participation, work and study skills, and social skills are not tapped through such testing. Since teachers also rated academic progress

higher than SOL mastery, they seem to be confirming that more types of learning occur in the classroom than are captured by the SOL Tests. As one co-teacher stated, "I didn't want to use SOL scores to determine if it was a success or not. It was so much more than that."

When compared with aggregate data in Virginia's Special Education State Improvement Plan Report (VDE, 2000), participation rates (above 90%) and pass rates (from 50% to 90%) for the students with LD in this study were greater. In addition, participation rates and pass rates for students with LD were much higher than found in a previous study in one Virginia school division (Spady, 2001). Several differences exist between divisions in this and the Spady study. Spady investigated an urban school division with an approximately 40% free and reduced cost lunch rate. The divisions in the current study were predominantly suburban and free and reduced cost lunch rates ranged from less than one percent to 14%. Another variable was the service delivery models in place for students with learning disabilities. The division participating in the Spady study was contacted as a potential site for the current study but they responded that they could not participate due to the lack of co-teaching at the elementary school level.

Despite students with LD having strong participation rates and pass rates near or above the 70% target for accreditation in all areas except history and social science, teachers were very concerned about the need for adequate resources. Most importantly, they pointed out that they needed greater numbers of special education staff to meet the needs of students with learning disabilities. This included greater support for content area subjects beyond language arts and mathematics. General education teachers wanted more help with their students with learning disabilities for greater portions of the day than the

one-to-two hour block provided. Increases in staff were recommended to address concerns about heavy paperwork and student-teacher ratio as well. According to the teachers' comments, limits in staff seemed to impact efficacy in both models. In addition, limited staff was seen as a potential deterrent to providing co-teaching at all, suggesting that resources play a role in determining what service delivery models can be adopted. This is consistent with the barriers to successful co-teaching identified in earlier studies (Gerber, 1996; Gerber & Popp, 2000a; Walther-Thomas, 1997) and the concept of responsible inclusion, which includes adequate resources as a prerequisite for successful programming (Vaughn & Schumm, 1995).

A critical consideration in determining what service delivery models were adopted was the level of student need. Teachers in both models discussed the importance of having options that would meet the needs of students. This frequently meant that students functioning below grade level should be pulled out for special education services. A strong theme emphasized that students with learning disabilities should be ready for the general education classroom. This runs counter to the intended difference between mainstreaming and inclusion. Whereas, mainstreaming was built on the premise that students with disabilities who were ready could participate in general education, inclusion, from which co-teaching evolved, supports changing the general education classroom to be ready for the student. However, changing the general education classroom was not part of the message given by teachers participating in this study. In fact, a benefit of the resource room model cited by several teachers was the elimination of the need for the general education teacher to make any changes in curriculum or instruction.

This is consistent with the findings reported by other researchers who explored what types of accommodations general education teachers were most likely to employ in their classrooms (Driver, 2000; Schumm & Vaughn, 1998). These studies noted that teachers were most likely to make changes that did not significantly affect the structure of their classrooms and were least likely to accept accommodations that required large amounts of change. A possible explanation for this seemingly limited change may be found in teachers' serious concerns regarding adequate resources. If caseloads are unmanageable, there may not be adequate special education staff to maintain reasonable numbers of students with learning disabilities in general education classes and provide co-teaching support. As a result, responsible inclusion could not exist. This possibility was voiced when teachers stated that limited staff and high caseloads prevented them from co-teaching.

Recommending pullout resource room programs for students with greater needs does have some support in the research. For example, Klingner and her associates (1998) found that the weakest students failed to make progress despite a comprehensive approach to supporting them in the general education classroom. How to differentiate and provide intensive direct instruction in the general education classroom remain challenges that are likely to require further change in the structure of general education classrooms and additional resources, especially in the form of staffing, professional development, and planning time.

This is not to say that co-teaching has not made a difference in general education classes. Unlike the philosophy underlying mainstreaming, teachers *did* recognize the feasibility of providing extra support in general education classrooms in the form of

accommodations and modifications and the value of teaching all students learning strategies. At the point where changes might be needed in general education curriculum and instruction, the perceived feasibility of delivering special education services in general education classes diminished. The change reflected here appears to be more incremental than transformational, first-order change rather than second-order change (Cuban, 1988). In other words, the schools and teachers in this study wove co-teaching into the existing structure rather than seeing it as an opportunity to reshape that structure.

While correlations between individual student scores on the SOL Tests and the Stanford-9 TA were significant, the effect size was moderate, with the coefficient of determination explaining 32% to 42% of the variance as being shared by the two measures. As the moderate correlation may suggest, students functioning in the above-average and below-average ranges had significant correlations between their Stanford-9 TA and SOL Test scores. Only history and social science correlated significantly (with a small to medium effect size) with Stanford-9 TA scores for students identified in the average range. Students in the average range in this study received Stanford-9 TA composite scores from the 59th percentile to the 77th percentile. This is lower than the 67% to 77% of shared variance reported for third and fifth grade in the reliability and validity report for the SOL Tests, which used the school as the unit of measure and compared rank order differences in school performance on the two measures. Analyses with larger sample sizes impact effect sizes and may help explain the difference in school and individual measures; however, the weaker correlation at the student level may warrant additional caution against using SOL performance in individual student decisions.

Problems and Limitations

A number of problems and limitations were encountered in the process of implementing this research study that should be considered when interpreting these data. One limitation was the existence of both models in some of the participating schools. Only one school in the study had no co-teaching. While there was a preference for schools with just the resource room option, obtaining willing participants was very challenging so mixed models were included to obtain adequate sample sizes. Frequently, co-taught classrooms included one or two students who received additional pullout services, but only two co-taught classrooms had all or most students with LD supported in resource rooms and co-taught classrooms. A limitation of a mixed model in the school is the potential for merging model characteristics, thereby reducing the ability to determine actual impact of a specific model. Given teacher reports that resource rooms may still be required for some students with LD and the lack of any purely co-taught special education classrooms within the schools in this study, it seems most feasible to compare mixed-model schools with schools that provide no co-teaching. Obtaining schools with only a resource model in place would strengthen the study.

While the sample size was stronger than in many previous studies, increased samples would improve the statistical strength of the analyses performed. The limited teacher sample size requires very cautious interpretation and was intended to add description to the student variables. The results from teacher questionnaires did indicate potential differences, and increasing teacher participation to statistical levels would allow more meaningful interpretation of the teacher-reported data. The lack of two surveys from special educators working in resource rooms was an additional limitation related to

the teacher sample, further restricting the variety of responses and the equal voice between the two models.

An additional sampling consideration must be noted. This study targeted the participation of classrooms in middle-class suburban neighborhoods. The schools and classrooms in the study were meeting the performance goals established for the Virginia Standards of Learning. While the author did not request "the best" be nominated, central office personnel were asked to target schools and classrooms with strong programs. In addition, reliance on volunteers increased the likelihood that the teachers who responded to the survey and their principals were committed to the programs they had in place and were excited about the results they were achieving. For these reasons, the results of a similar study conducted in less affluent and nonsuburban areas may be very different from the results reported here.

The study relied upon teacher self-report to explore instructional arrangements and written responses to open-ended efficacy questions. Fullan has written that, "Educational change depends on what teachers do and think – it's as simple and complex as that" (quoted in Rossman et al., 1988, p. 107). Adding in-class observations would strengthen comparisons of what "teachers do" in the two models. Also, some of the responses teachers shared were intriguing and would have been made richer if followup questions from an interview could have been added to explore more deeply "what teachers think."

A final limitation was the collection of data from teachers for the prior school year. Most teachers completed their surveys 3 to 10 months after working with the classes for which they provided reflections. Completing the survey closer to the end of

the actual school year being studied would likely strengthen the accuracy of teachers' recollections.

Recommendations for Future Research, Policy, and Practice

A number of findings derived from the study may have practical implications for others involved in research, policy, and practice related to standards-based reform and special education service delivery. Potential implications are discussed in this section.

Recommendations for Research

The present study attempted to control for difference is SES by selecting suburban schools in middle-class to upper-middle-class neighborhoods. The differences in participation and pass rates found in this study when compared with data from other areas of Virginia suggest the need for additional study. Further research exploring schools with varying demographics and differences in service delivery options, and the participation rates and pass rates of students with and without disabilities, could provide additional understanding of the contextual parameters that may impact the success of various service delivery choices. Several questions could be explored within such studies, including: Is co-teaching more likely to succeed in more affluent communities? What factors seem to explain differences in student participation and pass rates on state assessments?

The frequently observed teacher comment that students below grade level needed pullout special education services warrants further investigation. Since the students in both models did not appear statistically different on the standardized achievement measures collected in this study, how are teachers determining when to use a more restrictive placement? Does an increased level of accommodations provided to students

in resource placements explain the lack of difference in achievement? Was more intensive instruction in the resource room responsible for the lack of achievement differences?

The results led the researcher to question whether service delivery model can be adequately categorized and quantified as an independent variable. It may be more meaningful to view the presence of certain service delivery options for students with special needs as additional indicators of educational efficacy (Oakes, 1989; Shavelson, 1988). While the quantitative research for both inclusive practices and standards-based reform is limited (Biddle, 1997; McDonnell et al., 1997), the presence of successful co-teaching may be a factor to include in future efficacy studies. Just as functional ecologists study butterfly populations as an indicator of a healthy ecosystem (Hill, 1999), the success (as perceived by teachers and administrators) of co-teaching may suggest a school culture that supports teacher and student learning and is making progress toward greater student achievement. This "butterfly hypothesis" for co-teaching could be pursued through an exploration of the culture and rituals in schools with and without a co-teaching option. If "culture defines effectiveness" (Rossman et al., 1988, p. 134) exploring service delivery and school culture may be a promising line of inquiry. In addition, the work of Terrence Deal and Kent Peterson on shaping school culture (1999) could provide a lens for such comparisons.

Recommendations for Policy

Additional analysis of the SOL at the individual level appears warranted to ensure individual student decisions based on test results are well founded and other indicators of efficacy should be employed when looking at individual student and school level

performance. The SOL Tests sample student learning. Teachers in this study seemed to acknowledge other types of learning and experiences that made schools and classrooms successful. In addition, given the lack of reliability and validity data for the abbreviated version, caution is warranted in the interpretation of the Stanford 9 TA. Other indicators of individual student performance and school accountability should be considered, such as student attendance, retention rates, performance-based assessments, and outcomes measures such as graduation, college enrollment, and job employment. At the school level, client surveys, teacher attendance, and retention could provide additional measures of a school's progress and success. This recommendation is consistent with the policy statement of seven state education organizations opposed to a single-criterion use of the SOL (Virginia Education Association, 2001).

Several needs identified in previous studies continue to be stressed by teachers and must be addressed by leadership. The provision of adequate resources, personnel, time, and professional development are inputs teachers see as critical to the final outcomes, which include student achievement as reflected in SOL Test performance. Careful analysis of the impact of resources on accountability measures should be considered when crafting policy and establishing consequences for poor test performance.

An additional recommendation is to create more comprehensive data collection at the state and local level that captures service delivery as well as participation and pass rates on standard-based assessments for students with LD and other disabilities and their peers without disabilities. Such data would be valuable in informing policy-makers and

legislators who shape special education legislation, craft accountability measures across general education and special education, and influence the provision of resources.

Finally, the literature review identified common elements found in the theory and research related to successful, effective instruction and learning for students. General education and special education researchers are identifying the same critical factors, including the creation of a shared vision, provision of adequate resources, trained personnel, ongoing professional development supported by collegiality and collaboration, recognition of the change process and people's varying levels of acceptance of new initiatives, and ongoing evaluation and refinement. Leaders in general education and special education must engage in a dialogue to find ways to support these critical factors for all students and to document progress.

Recommendations for Practice

Families of students without disabilities sometimes voice concern about the impact of co-teaching on their children. While this study did not address curriculum directly, teachers did not report concerns about a "watered-down curriculum" when responding to questions about strengths and recommendations to improve service delivery. No one commented that co-teaching negatively impacted the achievement of general education students in the class. In fact, many comments suggested that a benefit of co-teaching was improved access to strategy instruction for all students. Administrative leaders and teachers should monitor this type of data in order to address this concern at the local level.

Looking at mixed models for service delivery, I have begun questioning the use of the term "co-teaching model." A model is a representation of something to be

constructed. The way study participants implemented it, the term "process" seems more appropriate. That is, co-teaching was adapted and added to the repertoire and options in the participating schools and classrooms. "Process" rather than "model" may be more palatable if a leader is trying to encourage adoption of co-teaching to expand the general education options of students with disabilities. Presented as a process, the locality can then create its own service delivery program to meet its students' needs.

In addition, if no difference in SOL Test performance is found for resource and co-taught classrooms, justification for the more restrictive resource setting still may be questioned on other academic, legal, social, and ethical bases. For example, Rea (1997) found little difference in standardized test performance between an inclusive program and a traditional resource room program for students with LD, but found significant differences on other measures such as attendance, grades, and types of IEP goals and objectives. The original model in this study - identifying factors that influence service delivery options - should be revisited. Policy-makers, administrators, teachers, and families must be willing to express beliefs about how to serve students with disabilities effectively and respectfully and explore the directives found in current legislation and litigation. In addition, the specific context within the school system, school, and classroom must be considered with resources matched to the needs of students.

Teachers' willingness to accommodate students with LD seemed to be influenced by their perception of adequate resources. Teachers' statements suggest that increasing the success of students with LD in co-taught classrooms and resource rooms will require additional support and resources. Teachers' reluctance to make changes, such as the inclusion of students with more significant needs, may be a very realistic and appropriate

reaction to a lack of adequate supports required to increase the likelihood of successful change (Rossman et al., 1988).

An original issue presented in this study was the concern of LD organizations over whether general education has changed enough to support students with LD effectively. The data indicating little difference in instructional arrangements in general education classes and teachers' emphasis on students being at or near grade level to benefit from co-teaching suggest that the answer may be "no." The lack of classrooms without co-teaching tempers this negative response. Co-teaching may have influenced instructional arrangements being used in other classrooms within the school. It is important to note that general education has changed in some ways (e.g., willingness to provide accommodations and teach strategies) and there appears to be greater dialogue and mutual support across general and special education where co-teaching has been implemented.

Summary

This study did not reveal statistically significant differences in student performance on standards-based assessment measures for students served with a resource room model or co-teaching, but the data from teachers suggest that co-teachers perceive the efficacy of their service delivery model more positively than their peers employing a resource room model. While these results add to the research base for service delivery models, there continues to be a lack of definitive data to support one model over the other. Without such support, the *beliefs* of communities, school personnel, and parents, as well as legislation and litigation will continue to shape the decisions made in placing

students with learning disabilities in various programs and creating appropriate service options.

Additional research is needed to determine whether the results of this study vary with changes in demographics and larger sample sizes are needed to add to the power of the results obtained. Research also holds another responsibility and promise in the development of effective service delivery options for students with LD and their peers. As Block (1993) stated:

> Write all the books you want. Give all the speeches you want. Run all the meetings you want. Bleat out your longing for how the world (education) should work, and you will get only one question back . . . "How?" (p. 233)

Research has the potential to explore that "how" for policy-makers and practitioners. Research can inform decision-makers by providing data to balance the speeches founded on philosophical stances and uncover promising and effective practices that operationalize the legislated and belief-directed policies teachers and administrators must acknowledge while providing educational services to all students.

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Appendix A

Detail on Teacher Demographics

Table A1

Response Rates for Teacher Demographics Items

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Grade Level * teacher&model	25	100.0%	0	.0%	25	100.0%
# Years at School * teacher&model	23	92.0%	2	8.0%	25	100.0%
Total Years Teaching * teacher&model	23	92.0%	2	8.0%	25	100.0%
Highest Degree * teacher&model	23	92.0%	2	8.0%	25	100.0%
Total Years Co-Teaching * teacher&model	23	92.0%	2	8.0%	25	100.0%
Year w/ Current Partner * teacher&model	23	92.0%	2	8.0%	25	100.0%

Table A2

Frequency of Grade Level Taught by Teacher Role and Model

Grade Level * teacher&model Crosstabulation							
			teacher&model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Grade Level	3	Count	3	1	1	1	6
		% within Grade Level	50.0%	16.7%	16.7%	16.7%	100.0%
		% within teacher&model	37.5%	12.5%	20.0%	25.0%	24.0%
	5	Count	5	7	4	3	19
		% within Grade Level	26.3%	36.8%	21.1%	15.8%	100.0%
		% within teacher&model	62.5%	87.5%	80.0%	75.0%	76.0%
Total		Count	8	8	5	4	25
		% within Grade Level	32.0%	32.0%	20.0%	16.0%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Table A3

Frequency of Teaching Experience by Teacher Role and Model

Years at Current School * Teacher							
			teacher&model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
# Years at School	<2 yrs	Count		2			2
		% within # Years at School		100.0%			100.0%
		% within teacher&model		25.0%			8.7%
	2-5 yrs	Count	3	4		3	10
		% within # Years at School	30.0%	40.0%		30.0%	100.0%
		% within teacher&model	37.5%	50.0%		75.0%	43.5%
	5-10 yrs	Count	3		3	1	7
		% within # Years at School	42.9%		42.9%	14.3%	100.0%
		% within teacher&model	37.5%		100.0%	25.0%	30.4%
	>10 yrs	Count	2	2			4
		% within # Years at School	50.0%	50.0%			100.0%
		% within teacher&model	25.0%	25.0%			17.4%
Total		Count	8	8	3	4	23
		% within # Years at School	34.8%	34.8%	13.0%	17.4%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Total Years Teaching * teacher&model							
Total Years Teaching	2-5 yrs	Count	1	1		1	3
		% within Total Years Teaching	33.3%	33.3%		33.3%	100.0%
		% within teacher&model	12.5%	12.5%		25.0%	13.0%
	5-10 yrs	Count	2	2	1	1	6
		% within Total Years Teaching	33.3%	33.3%	16.7%	16.7%	100.0%
		% within teacher&model	25.0%	25.0%	33.3%	25.0%	26.1%
	>10 yrs	Count	5	5	2	2	14
		% within Total Years Teaching	35.7%	35.7%	14.3%	14.3%	100.0%
		% within teacher&model	62.5%	62.5%	66.7%	50.0%	60.9%
Total		Count	8	8	3	4	23
		% within Total Years Teaching	34.8%	34.8%	13.0%	17.4%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Table A4

Frequencies for Highest Degree Held by Teacher Role and Model

Highest Degree * teacher&model Crosstabulation							
			teacher&model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Highest Degree	Bachelor's	Count	5	8	1	2	16
		% within Highest Degree	31.3%	50.0%	6.3%	12.5%	100.0%
		% within teacher&model	62.5%	100.0%	33.3%	50.0%	69.6%
	Master's	Count	3		2	2	7
		% within Highest Degree	42.9%		28.6%	28.6%	100.0%
		% within teacher&model	37.5%		66.7%	50.0%	30.4%
Total		Count	8	8	3	4	23
		% within Highest Degree	34.8%	34.8%	13.0%	17.4%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Table A5

Co-Teachers' Experience with Co-Teaching

			teacher&model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Total Years Co-Teaching	<2 yrs	Count		3			3
		% within Total Years Co-Teaching		100.0%			100.0%
		% within teacher&model		37.5%			13.0%
	2-5 yrs	Count		4		2	6
		% within Total Years Co-Teaching		66.7%		33.3%	100.0%
		% within teacher&model		50.0%		50.0%	26.1%
	5-10 yrs	Count		1		2	3
		% within Total Years Co-Teaching		33.3%		66.7%	100.0%
		% within teacher&model		12.5%		50.0%	13.0%
	5	Count	8		3		11
		% within Total Years Co-Teaching	72.7%		27.3%		100.0%
		% within teacher&model	100.0%		100.0%		47.8%
Total		Count	8	8	3	4	23
		% within Total Years Co-Teaching	34.8%	34.8%	13.0%	17.4%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Year w/ Current Partner * teacher&model Crosstabulation							
Year w/ Current Partner	<2 yrs	Count		3		2	5
		% within Year w/ Current Partner		60.0%		40.0%	100.0%
		% within teacher&model		37.5%		50.0%	21.7%
	2-5 yrs	Count		3		2	5
		% within Year w/ Current Partner		60.0%		40.0%	100.0%
		% within teacher&model		37.5%		50.0%	21.7%
	5-10 yrs	Count		1			1
		% within Year w/ Current Partner		100.0%			100.0%
		% within teacher&model		12.5%			4.3%
	5	Count	8	1	3		12
		% within Year w/ Current Partner	66.7%	8.3%	25.0%		100.0%
		% within teacher&model	100.0%	12.5%	100.0%		52.2%
Total		Count	8	8	3	4	23
		% within Year w/ Current Partner	34.8%	34.8%	13.0%	17.4%	100.0%
		% within teacher&model	100.0%	100.0%	100.0%	100.0%	100.0%

Table A6

Means and Standard Deviations for Teaching and Educational Experience by Teacher Role and Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
# Years at School * teacher&model	23	92.0%	2	8.0%	25	100.0%
Total Years Teaching * teacher&model	23	92.0%	2	8.0%	25	100.0%
Highest Degree * teacher&model	23	92.0%	2	8.0%	25	100.0%

Report

teacher&model		# Years at School	Total Years Teaching	Highest Degree
General Ed Resource	Mean	2.88	3.50	1.38
	N	8	8	8
	Std. Deviation	.83	.76	.52
	Median	3.00	4.00	1.00
	% of Total N	34.8%	34.8%	34.8%
General Ed Co-Taught	Mean	2.25	3.50	1.00
	N	8	8	8
	Std. Deviation	1.16	.76	.00
	Median	2.00	4.00	1.00
	% of Total N	34.8%	34.8%	34.8%
Special Ed Resource	Mean	3.00	3.67	1.67
	N	3	3	3
	Std. Deviation	.00	.58	.58
	Median	3.00	4.00	2.00
	% of Total N	13.0%	13.0%	13.0%
Special Ed Co-Taught	Mean	2.25	3.25	1.50
	N	4	4	4
	Std. Deviation	.50	.96	.58
	Median	2.00	3.50	1.50
	% of Total N	17.4%	17.4%	17.4%
Total	Mean	2.57	3.48	1.30
	N	23	23	23
	Std. Deviation	.90	.73	.47
	Median	2.00	4.00	1.00
	% of Total N	100.0%	100.0%	100.0%

Note: 1 - (<2 years), 2 - (2-5 years), 3 - (5-10 years), 4 - (10+ years).

Table A7

Means and Standard Deviations for Co-Teaching Experience

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Total Years Co-Teaching * teacher&model	12	100.0%	0	.0%	12	100.0%
Year w/ Current Partner * teacher&model	12	100.0%	0	.0%	12	100.0%

Report

teacher&model		Total Years Co-Teaching	Year w/ Current Partner
General Ed Co-Taught	Mean	1.75	2.13
	N	8	8
	Std. Deviation	.71	1.36
	Median	2.00	2.00
	% of Total N	66.7%	66.7%
Special Ed Co-Taught	Mean	2.50	1.50
	N	4	4
	Std. Deviation	.58	.58
	Median	2.50	1.50
	% of Total N	33.3%	33.3%
Total	Mean	2.00	1.92
	N	12	12
	Std. Deviation	.74	1.16
	Median	2.00	2.00
	% of Total N	100.0%	100.0%

Note: 1 – (<2 years), 2 – (2–5 years), 3 – (5–10 years), 4 – (10+ years.

Appendix B

Detail on Description of Service Delivery as Reported by Teachers

Table B1

Response Rate for Service Delivery Items

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Total students * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
# Special Ed T * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
# Paraprof * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Consult * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Pullout * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Co-Teach * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Other service * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Language Arts * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Math * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Science * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Social Studies * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Other * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Sessions cancelled * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Min/week lo * Teacher/Model	25	83.3%	5	16.7%	30	100.0%
Min/week hi * Teacher/Model	25	83.3%	5	16.7%	30	100.0%
Planning * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Consistent * Teacher/Model	25	83.3%	5	16.7%	30	100.0%

Table B2

Class Size/Caseload by Teacher Role and Model

Total students * Teacher/Model Crosstabulation

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Total Students	14	Count				1	1
		% within Total students				100.0%	100.0 %
		% within Teacher/Model				16.7%	3.8%
	17	Count				2	2
		% within Total students				100.0%	100.0 %
		% within Teacher/Model				33.3%	7.7%
	19	Count			1		1
		% within Total students			100.0%		100.0 %
		% within Teacher/Model			25.0%		3.8%
	20	Count				2	2
		% within Total students				100.0%	100.0 %
		% within Teacher/Model				33.3%	7.7%
	22	Count		1	3		4
		% within Total students		25.0%	75.0%		100.0 %
		% within Teacher/Model		12.5%	75.0%		15.4%
	23	Count		1			1
		% within Total students		100.0%			100.0 %
		% within Teacher/Model		12.5%			3.8%
	24	Count	5	4			9
		% within Total students	55.6%	44.4%			100.0 %
		% within Teacher/Model	62.5%	50.0%			34.6%
	25	Count	2			1	3
		% within Total students	66.7%			33.3%	100.0 %
		% within Teacher/Model	25.0%			16.7%	11.5%
	26	Count	1	2			3
		% within Total students	33.3%	66.7%			100.0 %
		% within Teacher/Model	12.5%	25.0%			11.5%
Total		Count	8	8	4	6	26
		% within Total students	30.8%	30.8%	15.4%	23.1%	100.0 %

Table B3

Frequency Distribution of Special Education Support by Teacher and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
# Special Ed t	1	Count	3	3	4	5	15
		% within # Special Ed T	20.0%	20.0%	26.7%	33.3%	100.0%
		% within Teacher/Model	37.5%	37.5%	100.0%	83.3%	57.7%
	2	Count	3	5		1	9
		% within # Special Ed T	33.3%	55.6%		11.1%	100.0%
		% within Teacher/Model	37.5%	62.5%		16.7%	34.6%
	3	Count	2				2
		% within # Special Ed T	100.0%				100.0%
		% within Teacher/Model	25.0%				7.7%
Total		Count	8	8	4	6	26
		% within # Special Ed T	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

# Paraprof * Teacher/Model Crosstabulation							
# Paraprof	0	Count	1	1	1	2	5
		% within # Paraprof	20.0%	20.0%	20.0%	40.0%	100.0%
		% within Teacher/Model	12.5%	12.5%	25.0%	33.3%	19.2%
	1	Count	5	6	2	4	17
		% within # Paraprof	29.4%	35.3%	11.8%	23.5%	100.0%
		% within Teacher/Model	62.5%	75.0%	50.0%	66.7%	65.4%
	2	Count	1	1			2
		% within # Paraprof	50.0%	50.0%			100.0%
		% within Teacher/Model	12.5%	12.5%			7.7%
	3	Count	1		1		2
		% within # Paraprof	50.0%		50.0%		100.0%
		% within Teacher/Model	12.5%		25.0%		7.7%
Total		Count	8	8	4	6	26
		% within # Paraprof	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Table B4

Frequency Counts for Special Education Service Delivery Models Employed by Teacher Type and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Consult	no	Count	5	6	3	6	20
		% within Consult	25.0%	30.0%	15.0%	30.0%	100.0%
		% within Teacher/Model	62.5%	75.0%	75.0%	100.0%	76.9%
	yes	Count	3	2	1		6
		% within Consult	50.0%	33.3%	16.7%		100.0%
		% within Teacher/Model	37.5%	25.0%	25.0%		23.1%
Total		Count	8	8	4	6	26
		% within Consult	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Pullout	no	Count				2	2
		% within Pullout				100.0%	100.0%
		% within Teacher/Model				33.3%	7.7%
	yes	Count	8	8	4	4	24
		% within Pullout	33.3%	33.3%	16.7%	16.7%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	66.7%	92.3%
Total		Count	8	8	4	6	26
		% within Pullout	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Co-Teach	no	Count	8		4		12
		% within Co-Teach	66.7%		33.3%		100.0%
		% within Teacher/Model	100.0%		100.0%		46.2%
	yes	Count		8		6	14
		% within Co-Teach		57.1%		42.9%	100.0%
		% within Teacher/Model		100.0%		100.0%	53.8%
Total		Count	8	8	4	6	26
		% within Co-Teach	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Other Service	no	Count	8	8	4	6	26
		% within Other service	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Total		Count	8	8	4	6	26
		% within Other service	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Table B5

Content Areas with Special Education Support by Teacher Role and Model

Content Area Teacher/Model Crosstabulation							
			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Lang. Arts	yes	Count	8	8	4	6	26
		% within Language Arts	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Total		Count	8	8	4	6	26
		% within Language Arts	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Math	no	Count	2	2	1		5
		% within Math	40.0%	40.0%	20.0%		100.0%
		% within Teacher/Model	25.0%	25.0%	25.0%		19.2%
	yes	Count	6	6	3	6	21
		% within Math	28.6%	28.6%	14.3%	28.6%	100.0%
		% within Teacher/Model	75.0%	75.0%	75.0%	100.0%	80.8%
Total		Count	8	8	4	6	26
		% within Math	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Science	no	Count	8	7	4	6	25
		% within Science	32.0%	28.0%	16.0%	24.0%	100.0%
		% within Teacher/Model	100.0%	87.5%	100.0%	100.0%	96.2%
	yes	Count		1			1
		% within Science		100.0%			100.0%
		% within Teacher/Model		12.5%			3.8%
Total		Count	8	8	4	6	26
		% within Science	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

continued

Table B5 (continued)

Content Areas with Special Education Support by Teacher Role and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Social Studies	no	Count	8	7	4	6	25
		% within Social Studies	32.0%	28.0%	16.0%	24.0%	100.0%
		% within Teacher/Model	100.0%	87.5%	100.0%	100.0%	96.2%
	yes	Count		1			1
		% within Social Studies		100.0%			100.0%
		% within Teacher/Model		12.5%			3.8%
Total		Count	8	8	4	6	26
		% within Social Studies	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Other	no	Count	8	8	4	6	26
		% within Other	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%
Total		Count	8	8	4	6	26
		% within Other	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Model		Language Arts	Math	Science	Social Studies	Other
Resource	Mean	1.00	.75	.00	.00	.00
	N	12	12	12	12	12
	Std. Deviation	.00	.45	.00	.00	.00
	% of Total N	46.2%	46.2%	46.2%	46.2%	46.2%
	Median	1.00	1.00	.00	.00	.00
Co-Teaching	Mean	1.00	.86	7.14E-02	7.14E-02	.00
	N	14	14	14	14	14
	Std. Deviation	.00	.36	.27	.27	.00
	% of Total N	53.8%	53.8%	53.8%	53.8%	53.8%
	Median	1.00	1.00	.00	.00	.00
Total	Mean	1.00	.81	3.85E-02	3.85E-02	.00
	N	26	26	26	26	26
	Std. Deviation	.00	.40	.20	.20	.00
	Median	1.00	1.00	.00	.00	.00

Table B6

Frequency of Sessions Cancelled by Teacher Role and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Sessions Cancelled	often	Count		2		1	3
		% within Sessions cancelled		66.7%		33.3%	100.0%
		% within Teacher/Model		25.0%		16.7%	11.5%
	sometimes	Count		1		1	2
		% within Sessions cancelled		50.0%		50.0%	100.0%
		% within Teacher/Model		12.5%		16.7%	7.7%
	rarely	Count	7	5	4	4	20
		% within Sessions cancelled	35.0%	25.0%	20.0%	20.0%	100.0%
		% within Teacher/Model	87.5%	62.5%	100.0%	66.7%	76.9%
	never	Count	1				1
		% within Sessions cancelled	100.0%				100.0%
		% within Teacher/Model	12.5%				3.8%
Total		Count	8	8	4	6	26
		% within Sessions cancelled	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Table B7

Frequency of Range in Minutes/Week of Special Education for Students in Classes by Teacher Role and Model

Min/week lo * Teacher/Model Crosstabulation							
			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Min/week lo	100	Count		2	1		3
		% within Min/week lo		66.7%	33.3%		100.0%
		% within Teacher/Model		25.0%	25.0%		12.0%
	150	Count	1				1
		% within Min/week lo	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
	225	Count	2				2
		% within Min/week lo	100.0%				100.0%
		% within Teacher/Model	28.6%				8.0%
	250	Count		1		2	3
		% within Min/week lo		33.3%		66.7%	100.0%
		% within Teacher/Model		12.5%		33.3%	12.0%
	280	Count	1				1
		% within Min/week lo	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
	300	Count	1	2	2	2	7
		% within Min/week lo	14.3%	28.6%	28.6%	28.6%	100.0%
		% within Teacher/Model	14.3%	25.0%	50.0%	33.3%	28.0%
	450	Count		3	1		4
		% within Min/week lo		75.0%	25.0%		100.0%
		% within Teacher/Model		37.5%	25.0%		16.0%
	600	Count	1			1	2
		% within Min/week lo	50.0%			50.0%	100.0%
		% within Teacher/Model	14.3%			16.7%	8.0%
	750	Count				1	1
		% within Min/week lo				100.0%	100.0%
		% within Teacher/Model				16.7%	4.0%
	900	Count	1				1
		% within Min/week lo	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
Total		Count	7	8	4	6	25
		% within Min/week lo	28.0%	32.0%	16.0%	24.0%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

continued

Table B7 (continued)

Frequency of Range in Minutes/Week of Special Education for Students in Classes by Teacher Role and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Min/week hi	250	Count	1			2	3
		% within Min/week hi	33.3%			66.7%	100.0%
		% within Teacher/Model	14.3%			33.3%	12.0%
	280	Count	1				1
		% within Min/week hi	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
	300	Count		3			3
		% within Min/week hi		100.0%			100.0%
		% within Teacher/Model		37.5%			12.0%
	450	Count		3	1		4
		% within Min/week hi		75.0%	25.0%		100.0%
		% within Teacher/Model		37.5%	25.0%		16.0%
	525	Count	1				1
		% within Min/week hi	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
	600	Count	3			2	5
		% within Min/week hi	60.0%			40.0%	100.0%
		% within Teacher/Model	42.9%			33.3%	20.0%
	900	Count	1	2	2	1	6
		% within Min/week hi	16.7%	33.3%	33.3%	16.7%	100.0%
		% within Teacher/Model	14.3%	25.0%	50.0%	16.7%	24.0%
	1125	Count			1		1
		% within Min/week hi			100.0%		100.0%
		% within Teacher/Model			25.0%		4.0%
	1224	Count				1	1
		% within Min/week hi				100.0%	100.0%
		% within Teacher/Model				16.7%	4.0%
Total		Count	7	8	4	6	25
		% within Min/week hi	28.0%	32.0%	16.0%	24.0%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Table B8

Co-Planning by Teacher Role and Model

			Teacher/Model				Total
			General Ed Resource	General Ed Co-Taught	Special Ed Resource	Special Ed Co-Taught	
Planning	<15 min	Count	7	2	1	2	12
		% within Planning	58.3%	16.7%	8.3%	16.7%	100.0%
		% within Teacher/Model	87.5%	25.0%	25.0%	33.3%	46.2%
	15-30 min	Count		4	2	2	8
		% within Planning		50.0%	25.0%	25.0%	100.0%
		% within Teacher/Model		50.0%	50.0%	33.3%	30.8%
	>30 min	Count	1	2		2	5
		% within Planning	20.0%	40.0%		40.0%	100.0%
		% within Teacher/Model	12.5%	25.0%		33.3%	19.2%
	4	Count			1		1
		% within Planning			100.0%		100.0%
		% within Teacher/Model			25.0%		3.8%
Total		Count	8	8	4	6	26
		% within Planning	30.8%	30.8%	15.4%	23.1%	100.0%
		% within Teacher/Model	100.0%	100.0%	100.0%	100.0%	100.0%

Consistent	0	Count	1		1		2
		% within Consistent	50.0%		50.0%		100.0%
		% within Teacher/Model	14.3%		25.0%		8.0%
	often	Count	4	5	3	4	16
		% within Consistent	25.0%	31.3%	18.8%	25.0%	100.0%
		% within Teacher/Model	57.1%	62.5%	75.0%	66.7%	64.0%
	sometimes	Count	1	2			3
		% within Consistent	33.3%	66.7%			100.0%
		% within Teacher/Model	14.3%	25.0%			12.0%
	rarely	Count		1		2	3
		% within Consistent		33.3%		66.7%	100.0%
		% within Teacher/Model		12.5%		33.3%	12.0%
	never	Count	1				1
		% within Consistent	100.0%				100.0%
		% within Teacher/Model	14.3%				4.0%
Total		Count	7	8	4	6	25
		% within Consistent	28.0%	32.0%	16.0%	24.0%	100.0%

Table B9

Descriptive Statistics for Special Education Service Delivery by Teacher Role and Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Total students * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
# Special Ed T * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
# Paraprof * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Sessions cancelled * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Min/week lo * Teacher/Model	25	83.3%	5	16.7%	30	100.0%
Min/week hi * Teacher/Model	25	83.3%	5	16.7%	30	100.0%
Planning * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
Consistent * Teacher/Model	25	83.3%	5	16.7%	30	100.0%

Teacher/Model		Total students	# Special Ed T	# Paraprof	Sessions cancelled	Min/week lo	Min/week hi	Planning	Consistent
General Ed Resource	Mean	24.50	1.88	1.25	3.13	382.86	536.43	1.25	1.43
	N	8	8	8	8	7	7	8	7
	Std. Deviation	.76	.83	.89	.35	269.60	220.69	.71	1.27
	Median	24.00	2.00	1.00	3.00	280.00	600.00	1.00	1.00
	% of Total N	30.8%	30.8%	30.8%	30.8%	28.0%	28.0%	30.8%	28.0%
General Ed Co-Taught	Mean	24.13	1.63	1.00	2.38	300.00	506.25	2.00	1.50
	N	8	8	8	8	8	8	8	8
	Std. Deviation	1.36	.52	.53	.92	146.39	252.75	.76	.76
	Median	24.00	2.00	1.00	3.00	300.00	450.00	2.00	1.00
	% of Total N	30.8%	30.8%	30.8%	30.8%	32.0%	32.0%	30.8%	32.0%
Special Ed Resource	Mean	21.25	1.00	1.25	3.00	287.50	843.75	2.25	.75
	N	4	4	4	4	4	4	4	4
	Std. Deviation	1.50	.00	1.26	.00	143.61	283.12	1.26	.50
	Median	22.00	1.00	1.00	3.00	300.00	900.00	2.00	1.00
	% of Total N	15.4%	15.4%	15.4%	15.4%	16.0%	16.0%	15.4%	16.0%
Special Ed Co-Taught	Mean	18.83	1.17	.67	2.50	408.33	637.33	2.00	1.67
	N	6	6	6	6	6	6	6	6
	Std. Deviation	3.76	.41	.52	.84	213.11	378.42	.89	1.03
	Median	18.50	1.00	1.00	3.00	300.00	600.00	2.00	1.00
	% of Total N	23.1%	23.1%	23.1%	23.1%	24.0%	24.0%	23.1%	24.0%
Total	Mean	22.58	1.50	1.04	2.73	347.20	600.16	1.81	1.40
	N	26	26	26	26	25	25	26	25
	Std. Deviation	3.06	.65	.77	.72	197.74	291.59	.90	.96
	Median	24.00	1.00	1.00	3.00	300.00	600.00	2.00	1.00

Note. Sessions Cancelled & Consistent: 1 – often, 2 – sometimes, 3 – rarely, 4 – never; Planning: 1 – (< 15 minutes), 2 – (15–30 minutes), 3 – (30+ minutes).

continued

Table B9 (continued)

Descriptive Statistics for Special Education Service Delivery by Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Total students * Model	26	86.7%	4	13.3%	30	100.0%
# Special Ed T * Model	26	86.7%	4	13.3%	30	100.0%
# Paraprof * Model	26	86.7%	4	13.3%	30	100.0%
Consult * Model	26	86.7%	4	13.3%	30	100.0%
Pullout * Model	26	86.7%	4	13.3%	30	100.0%
Co-Teach * Model	26	86.7%	4	13.3%	30	100.0%
Other service * Model	26	86.7%	4	13.3%	30	100.0%

Model		Total students	# Special Ed T	# Paraprof	Consult	Pullout	Co-Teach	Other service
Resource	Mean	23.42	1.58	1.25	.33	1.00	.00	.00
	N	12	12	12	12	12	12	12
	Std. Deviation	1.88	.79	.97	.49	.00	.00	.00
	% of Total N	46.2%	46.2%	46.2%	46.2%	46.2%	46.2%	46.2%
	Median	24.00	1.00	1.00	.00	1.00	.00	.00
Co-Teaching	Mean	21.86	1.43	.86	.14	.86	1.00	.00
	N	14	14	14	14	14	14	14
	Std. Deviation	3.72	.51	.53	.36	.36	.00	.00
	% of Total N	53.8%	53.8%	53.8%	53.8%	53.8%	53.8%	53.8%
	Median	23.50	1.00	1.00	.00	1.00	1.00	.00
Total	Mean	22.58	1.50	1.04	.23	.92	.54	.00
	N	26	26	26	26	26	26	26
	Std. Deviation	3.06	.65	.77	.43	.27	.51	.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Median	24.00	1.00	1.00	.00	1.00	1.00	.00

Model		Sessions cancelled	Min/week lo	Min/week hi	Planning	Consistent
Resource	Mean	3.08	348.18	648.18	1.58	1.18
	N	12	11	11	12	11
	Std. Deviation	.29	228.28	278.05	1.00	1.08
	% of Total N	46.2%	44.0%	44.0%	46.2%	44.0%
	Median	3.00	300.00	600.00	1.00	1.00
Co-Teaching	Mean	2.43	346.43	562.43	2.00	1.57
	N	14	14	14	14	14
	Std. Deviation	.85	179.17	306.61	.78	.85
	% of Total N	53.8%	56.0%	56.0%	53.8%	56.0%
	Median	3.00	300.00	450.00	2.00	1.00
Total	Mean	2.73	347.20	600.16	1.81	1.40
	N	26	25	25	26	25
	Std. Deviation	.72	197.74	291.59	.90	.96
	Median	3.00	300.00	600.00	2.00	1.00

Note. Sessions Cancelled & Consistent: 1 – often, 2 – sometimes, 3 – rarely, 4 – never; Planning: 1 – (< 15 minutes), 2 – (15–30 minutes), 3 – (30+ minutes).

Table B10

Frequency of Ratings for Special Educator's Role in Co-Teaching

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
If C-T, desc. * Type (G/S)	14	100.0%	0	.0%	14	100.0%

			Type (G/S)		Total
			General Education	Special Education	
If C-T, desc.	occasionally led	Count	1	2	3
		% within If C-T, desc.	33.3%	66.7%	100.0 %
		% within Type (G/S)	12.5%	33.3%	21.4%
	varied roles	Count	7	1	8
		% within If C-T, desc.	87.5%	12.5%	100.0 %
		% within Type (G/S)	87.5%	16.7%	57.1%
	equal responsibility	Count		3	3
		% within If C-T, desc.		100.0%	100.0 %
		% within Type (G/S)		50.0%	21.4%
Total		Count	8	6	14
		% within If C-T, desc.	57.1%	42.9%	100.0 %
		% within Type (G/S)	100.0%	100.0%	100.0 %

Appendix C

Detail on Student Demographics

Table C1

Response Rates by Demographic Characteristics

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Grade * Model	319	100.0%	0	.0%	319	100.0%
Gender * Model	319	100.0%	0	.0%	319	100.0%
Ethnicity * Model	315	98.7%	4	1.3%	319	100.0%
IEP disability * Model	319	100.0%	0	.0%	319	100.0%
Yrs Retained * Model	299	93.7%	20	6.3%	319	100.0%

Table C2

Descriptive Statistics and ANOVA for Student Age and Stanford-9 TA Composite Score by Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Age * Model	315	98.7%	4	1.3%	319	100.0%
S-9 Comp * Model	197	61.8%	122	38.2%	319	100.0%

Model		Age	S-9 Comp
Resource	Mean	10.422	65.79
	N	184	99
	Std. Deviation	1.019	20.68
	Median	10.670	70.00
	% of Total N	58.4%	50.3%
Co-Teaching	Mean	10.860	65.04
	N	131	98
	Std. Deviation	.858	22.15
	Median	11.080	70.00
	% of Total N	41.6%	49.7%
Total	Mean	10.604	65.42
	N	315	197
	Std. Deviation	.978	21.37
	Median	10.833	70.00

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Resource	99	65.79	20.68	2.08	61.66	69.91	23	99
Co-Teaching	98	65.04	22.15	2.24	60.60	69.48	10	96
Total	197	65.42	21.37	1.52	62.41	68.42	10	99

continued

Table C2 (continued)

Descriptive Statistics and ANOVA for Student Age and Stanford-9 TA Composite Score by Model

ANOVA S-9 Comp

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27.486	1	27.486	.060	.807
Within Groups	89508.382	195	459.017		
Total	89535.868	196			

Table C3

Frequencies and Chi-Squares for Student Demographics by Model

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Model	319	100.0%	0	.0%	319	100.0%

			Model		Total
			Resource	Co-Teaching	
Gender	Male	Count	85	67	152
		% within Gender	55.9%	44.1%	100.0%
		% within Model	45.2%	51.1%	47.6%
	Female	Count	103	64	167
		% within Gender	61.7%	38.3%	100.0%
		% within Model	54.8%	48.9%	52.4%
Total		Count	188	131	319
		% within Gender	58.9%	41.1%	100.0%

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.089(b)	1	.297		
Continuity Correction(a)	.864	1	.353		
Likelihood Ratio	1.089	1	.297		
Fisher's Exact Test				.307	.176
Linear-by-Linear Association	1.086	1	.297		
N of Valid Cases	319				

a Computed only for a 2x2 table.

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 62.42.

continued

Table C3 (continued)

Frequencies and Chi-Squares for Student Demographics by Model

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Ethnicity * Model	315	98.7%	4	1.3%	319	100.0%

			Model		Total
			Resource	Co-Teaching	
Ethnicity	Caucasian	Count	142	108	250
		% within Ethnicity	56.8%	43.2%	100.0%
		% within Model	77.2%	82.4%	79.4%
	African American	Count	35	18	53
		% within Ethnicity	66.0%	34.0%	100.0%
		% within Model	19.0%	13.7%	16.8%
	Hispanic	Count	3	2	5
		% within Ethnicity	60.0%	40.0%	100.0%
		% within Model	1.6%	1.5%	1.6%
	Asian	Count	3	3	6
		% within Ethnicity	50.0%	50.0%	100.0%
		% within Model	1.6%	2.3%	1.9%
	Other	Count	1		1
		% within Ethnicity	100.0%		100.0%
		% within Model	.5%		.3%
Total		Count	184	131	315
		% within Ethnicity	58.4%	41.6%	100.0%

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.428(a)	4	.658
Likelihood Ratio	2.816	4	.589
Linear-by-Linear Association	.646	1	.421
N of Valid Cases	315		

A 6 cells (60.0%) have expected count less than 5. The minimum expected count is .42.

continued

Table C3 (continued)

Frequencies and Chi-Squares for Student Demographics by Model

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
IEP disability * Model	319	100.0%	0	.0%	319	100.0%

IEP disability * Model Crosstabulation

			Model		Total
			Resource	Co-Teaching	
IEP disability	0	Count	157	93	250
		% within IEP disability	62.8%	37.2%	100.0%
		% within Model	83.5%	71.0%	78.4%
	LD	Count	26	26	52
		% within IEP disability	50.0%	50.0%	100.0%
		% within Model	13.8%	19.8%	16.3%
	OHI	Count	1	5	6
		% within IEP disability	16.7%	83.3%	100.0%
		% within Model	.5%	3.8%	1.9%
	ED	Count	1	3	4
		% within IEP disability	25.0%	75.0%	100.0%
		% within Model	.5%	2.3%	1.3%
	SLI	Count	1	1	2
		% within IEP disability	50.0%	50.0%	100.0%
		% within Model	.5%	.8%	.6%
	DD	Count	1	1	2
		% within IEP disability	50.0%	50.0%	100.0%
		% within Model	.5%	.8%	.6%
	BD	Count		1	1
		% within IEP disability		100.0%	100.0%
		% within Model		.8%	.3%
	504	Count	1	1	2
		% within IEP disability	50.0%	50.0%	100.0%
		% within Model	.5%	.8%	.6%
Total		Count	188	131	319
		% within IEP disability	58.9%	41.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.224(a)	7	.129
Likelihood Ratio	11.672	7	.112
Linear-by-Linear Association	.101	1	.750
N of Valid Cases	319		

a 12 cells (75.0%) have expected count less than 5. The minimum expected count is .41.

Table C4

Frequencies and Chi-Squares for Demographics for Students with LD by Model

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Grade * Model	52	100.0%	0	.0%	52	100.0%
Gender * Model	52	100.0%	0	.0%	52	100.0%
Ethnicity * Model	51	98.1%	1	1.9%	52	100.0%
Yrs Retained * Model	51	98.1%	1	1.9%	52	100.0%

Crosstab

			Model		Total
			Resource	Co-Teaching	
Grade	3	Count	6	3	9
		% within Grade	66.7%	33.3%	100.0%
		% within Model	23.1%	11.5%	17.3%
	5	Count	20	23	43
		% within Grade	46.5%	53.5%	100.0%
		% within Model	76.9%	88.5%	82.7%
Total		Count	26	26	52
		% within Grade	50.0%	50.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.209(b)	1	.271		
Continuity Correction(a)	.537	1	.463		
Likelihood Ratio	1.229	1	.268		
Fisher's Exact Test				.465	.233
Linear-by-Linear Association	1.186	1	.276		
N of Valid Cases	52				
a Computed only for a 2x2 table					
b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.50.					

			Model		Total
			Resource	Co-Teaching	
Gender	Male	Count	15	17	32
		% within Gender	46.9%	53.1%	100.0%
		% within Model	57.7%	65.4%	61.5%
	Female	Count	11	9	20
		% within Gender	55.0%	45.0%	100.0%
		% within Model	42.3%	34.6%	38.5%
Total		Count	26	26	52
		% within Gender	50.0%	50.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.325(b)	1	.569		
Continuity Correction(a)	.081	1	.776		
Likelihood Ratio	.325	1	.568		
Fisher's Exact Test				.776	.388
Linear-by-Linear Association	.319	1	.572		
N of Valid Cases	52				
a Computed only for a 2x2 table.					
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.00.					

continued

Table C4 (continued)

Frequencies and Chi-Squares for Demographics for Students with LD by Model

			Model		Total
			Resource	Co-Teaching	
Ethnicity	Caucasian	Count	22	21	43
		% within Ethnicity	51.2%	48.8%	100.0%
		% within Model	88.0%	80.8%	84.3%
	African American	Count	3	4	7
		% within Ethnicity	42.9%	57.1%	100.0%
		% within Model	12.0%	15.4%	13.7%
	Hispanic	Count		1	1
		% within Ethnicity		100.0%	100.0%
		% within Model		3.8%	2.0%
Total		Count	25	26	51
		% within Ethnicity	49.0%	51.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.147(a)	2	.564
Likelihood Ratio	1.533	2	.465
Linear-by-Linear Association	.831	1	.362
N of Valid Cases	51		
a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .49.			

			Model		Total
			Resource	Co-Teaching	
Yrs Retained	0	Count	19	20	39
		% within Yrs Retained	48.7%	51.3%	100.0%
		% within Model	76.0%	76.9%	76.5%
	1	Count	6	6	12
		% within Yrs Retained	50.0%	50.0%	100.0%
		% within Model	24.0%	23.1%	23.5%
Total		Count	25	26	51
		% within Yrs Retained	49.0%	51.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.006(b)	1	.938		
Continuity Correction(a)	.000	1	1.000		
Likelihood Ratio	.006	1	.938		
Fisher's Exact Test				1.000	.599
Linear-by-Linear Association	.006	1	.939		
N of Valid Cases	51				
a Computed only for a 2x2 table.					
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.88.					

Table C5

Descriptive Statistics and ANOVA for Students with LD: Age and Stanford-9 TA Composite Score by Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
S-9 Comp * Model	38	73.1%	14	26.9%	52	100.0%
Yrs Retained * Model	51	98.1%	1	1.9%	52	100.0%
Sp ed min/wk * Model	52	100.0%	0	.0%	52	100.0%
Yrs in special ed * Model	51	98.1%	1	1.9%	52	100.0%

Model		S-9 Comp	Yrs Retained	Sp ed min/wk	Yrs in Special Ed
Resource	Mean	48.94	.24	387.69	2.89
	N	17	25	26	25
	Std. Deviation	19.13	.44	288.04	1.82
	Median	43.00	.00	350.00	2.00
	% of Total N	44.7%	49.0%	50.0%	49.0%
Co-Teaching	Mean	40.38	.23	434.23	3.20
	N	21	26	26	26
	Std. Deviation	19.92	.43	208.02	1.67
	Median	36.00	.00	430.00	3.00
	% of Total N	55.3%	51.0%	50.0%	51.0%
Total	Mean	44.21	.24	410.96	3.05
	N	38	51	52	51
	Std. Deviation	19.78	.43	249.86	1.73
	Median	39.00	.00	412.50	3.00

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
S-9 Comp * Model	Between Groups	(Combined)	688.422	1	688.422	1.797	.189
	Within Groups		13793.894	36	383.164		
	Total		14482.316	37			
Yrs Retained * Model	Between Groups	(Combined)	.001	1	.001	.006	.940
	Within Groups		9.175	49	.187		
	Total		9.176	50			
Sp ed min/wk * Model	Between Groups	(Combined)	28155.769	1	28155.769	.446	.507
	Within Groups		3155896.154	50	63117.923		
	Total		3184051.923	51			
Yrs in special ed * Model	Between Groups	(Combined)	1.240	1	1.240	.408	.526
	Within Groups		148.762	49	3.036		
	Total		150.002	50			

Table C6

General Linear Model: MANOVA Comparing Students with LD by Model (Stanford-9 TA, Years Retained, Minutes/Week in Special Education, Years in Special Education)

Between-Subjects Factors

		Value Label	N
Model	1	Resource	16
	3	Co-Teaching	21

Multivariate Tests(b)

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.959	187.542(a)	4.000	32.000	.000
	Wilks' Lambda	.041	187.542(a)	4.000	32.000	.000
	Hotelling's Trace	23.443	187.542(a)	4.000	32.000	.000
	Roy's Largest Root	23.443	187.542(a)	4.000	32.000	.000
MODEL	Pillai's Trace	.088	.773(a)	4.000	32.000	.551
	Wilks' Lambda	.912	.773(a)	4.000	32.000	.551
	Hotelling's Trace	.097	.773(a)	4.000	32.000	.551
	Roy's Largest Root	.097	.773(a)	4.000	32.000	.551

a Exact statistic

b Design: Intercept+MODEL

Table C7

Analyses to Compare Subgroups

Statistics S-9 Comp

N	Valid	197
	Missing	122

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
student level * Model	197	61.8%	122	38.2%	319	100.0%

			Model		Total
			Resource	Co-Teaching	
Student level	Below-average	Count	35	31	66
		% within student level	53.0%	47.0%	100.0%
		% within Model	35.4%	31.6%	33.5%
	Average	Count	29	35	64
		% within student level	45.3%	54.7%	100.0%
		% within Model	29.3%	35.7%	32.5%
	Above-average	Count	35	32	67
		% within student level	52.2%	47.8%	100.0%
		% within Model	35.4%	32.7%	34.0%
Total		Count	99	98	197
		% within student level	50.3%	49.7%	100.0%
		% within Model	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.934(a)	2	.627
Likelihood Ratio	.935	2	.627
Linear-by-Linear Association	.008	1	.931
N of Valid Cases	197		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.84.

Appendix D

Teacher Questionnaires and Student Data Spreadsheet

The College Of
WILLIAM & MARY

School of Education
P.O. Box 8795
Williamsburg, VA 23187-8795
Office: (757) 221-4002
FAX: (757) 221-2988

Survey Cover Letter

Dear Participant:

Thank you for your willingness to share your insights and assist with this study comparing Co-Teaching and traditional special education resource room service delivery. The attached questionnaire requests information on demographics, your classroom and instructional strategies, and service delivery model efficacy. After completing the questionnaire, please return it by mailing in the stamped envelope provided by April 25, 2001. For your responses to remain anonymous to the researcher, the questionnaire has been coded. Please mail the enclosed consent letter with its self-addressed, stamped envelope *separately* when you complete the questionnaire. This will allow me to monitor who has responded and follow up, as needed.

Should you have any questions about this questionnaire or any component of the study, please feel free to contact me:

(h) 804-559-4140
(w) 757-221-4002
email: cdem4@erols.com

Again, thank you for your time.

Sincerely,

Patricia A. Popp
Doctoral candidate

9176 Harvey Hollow Drive
Mechanicsville, Virginia 23116

The College Of
WILLIAM & MARY

School of Education
P.O. Box 8795
Williamsburg, VA 23187-8795
Office: (757) 221-4002
FAX: (757) 221-2988

Teacher Letter of Consent

Dear Participant:

Thank you for your willingness to participate in this investigation of teacher perceptions of efficacy and academic achievement of students with and without disabilities in Co-Taught and traditional special education resource room/general education programs. The primary purpose of this study is to compare teacher perceptions of program efficacy and student achievement in the two models. The focus will be instruction delivered in third and fifth grade Co-Taught classrooms or resource rooms for students with special needs and general education classrooms with one teacher for the remaining students in the class. Your school division and The College of William and Mary Research Committee have approved the study.

Your participation in this study is voluntary. At any time, without consequences, you may choose not to answer questions or withdraw your participation. Your participation involves completion of the enclosed questionnaire, which is estimated to take approximately 30 to 45 minutes to complete. For your participation, a stipend of five dollars is provided as a small thank you for your time.

The information you provide will be held in strictest confidence. Information from the teacher questionnaire will remain anonymous to the researcher. This consent letter should be mailed separately when the questionnaire is completed. Receipt of the consent letter will allow the researcher to follow up with reminders to encourage completion for questionnaires that are delayed.

Thank you for your participation. It is hoped that you will find your participation rewarding. You will receive an executive summary of the final research report when completed. If you have any questions about the study or if there is additional information that you would like to provide, please feel free to contact me at my office (757) 221-4002, at home (804) 559-4140, or via e-mail cdem4@erols.com.

Sincerely,

Patricia A. Popp
Doctoral Candidate

I have read this letter and I agree to participate in this investigation.
Participant Name: _____ Date: _____

Code: _____

Service Delivery Models
Special Education Teacher

I. Personal Information. Please circle the responses that *best* describe you and your role *last year,* during 1999-00.

A. Special education teacher:
1) Who spent more than 50% of your instructional day teaching in a special education resource room.
2) Who spent more than 50% of your instructional day co-teaching in general education classrooms.

B. Gender:
1) Male
2) Female

As of June 2000:

C. Number of years you taught at this school:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years

D. Total number of years as a teacher:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years

E. Highest college degree held:
1) Bachelor's
2) Master's
3) EDS or CAGS
4) Doctorate

F. If you were co-teaching with general education teachers, total number of years you co-taught:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years
5) Not applicable

G. If you were co-teaching, number of years you co-taught with your 1999-2000 partner(s):
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years
5) Not applicable

Service Delivery Models
Special Education Teacher
II. Caseload Demographics for 1999-00

Please answer the following questions based on the students you served during the 1999-2000 school year.

_____ 1. Total number of students with IEPs on your caseload

_____ 2. Total number of students with 504 Plans on your caseload

_____ 3. Number of disability types represented on your caseload

Circle the disability types represented on your caseload:

autism
deaf-blindness
developmental delay
hearing impairment
mental retardation
multiple disabilities
orthopedic impairment injury
visual impairment
other health impairment
serious emotional disturbance
severe or profound disability
specific learning disability
speech or language impairment
traumatic brain injury
visual impairment

_____ 4. Number of grade levels you served.

Circle the grade levels you served: Pre K

K
1
2
3
4
5
6

Code: _____

Service Delivery Models
Special Education Teacher

If you are completing the questionnaire for two classes, please complete a separate form for sections III and IV for *each* class. An additional insert is provided for this purpose.

III. Program Description (circle your responses)

A. Grade Level for Class:
   1) Third
   2) Fifth

B. Please describe how your students received their special education instruction.

   1) How many special education teachers were involved with your students?
      a) One (yourself)
      b) Two
      c) Three
      d) More than three

   2) How many paraeducators (teacher aides) worked with your students?
      a) One
      b) Two
      c) Three
      d) More than three

   3) How were services delivered? (Circle all that apply.)
      a) Consultation
      b) Pullout resource room
      c) Co-teaching
      d) Other _____

   4) In what subjects did students receive special education services? (Circle all that apply.)
      a) Language arts
      b) Mathematics
      c) Science
      d) Social Studies
      e) Other _____

   5) If special education sessions with students were cancelled, how frequently did this occur?
      a) Often (at least once a month)
      b) Sometimes (once every one to two months)
      c) Rarely (less than once every two months)
      d) Never

   6) Please describe the schedule for delivering this support? You may use a range if services varied for different students (e.g., 45 minutes to 1 hour, five times per week).

      a) Length of sessions (in minutes) _____

      b) Number of sessions per week _____

Service Delivery Models
Special Education Teacher

C. Planning/consultation time with your students general education teacher(s):

1) Please estimate the total amount of time scheduled for planning/consulting per week.
   a) Less than fifteen minutes
   b) Fifteen to thirty minutes
   c) Thirty to minutes to one hour
   d) More than one hour

2) How consistently was this schedule kept?
   a) Often (at least once a month)
   b) Sometimes (once every one to two months)
   c) Rarely (less than once every two months)
   d) Never

D. How frequently (often, sometimes, rarely, never) did you employ the following instructional arrangements with this class during lessons in 1999-00?

		Often (daily/weekly)	Sometimes (monthly)	Rarely (less than monthly)	Never
1)	Whole group	O	S	R	N
2)	Small group	O	S	R	N
3)	Cooperative groups	O	S	R	N
4)	Peer tutoring	O	S	R	N
5)	Differentiated instruction	O	S	R	N
6)	Computer-assisted instruction	O	S	R	N
7)	Multimedia (video, audio)	O	S	R	N
8)	Lecture	O	S	R	N
9)	Independent practice	O	S	R	N

E. *Respond to this item only if you were co-teaching in this class.* Please circle the one response that best describes the co-teaching arrangement.

1) I often felt like an aide and had little involvement in instructional decisions.

2) I worked only with students with special needs while in the class.

3) I occasionally led the instruction for the class.

4) The general education teacher and I varied our roles and responsibilities during instruction with large and small group arrangements.

5) I often shared instructional responsibilities equally with my partner.

F. Is there anything else about your model for delivering services to students with special needs you would like to share? (Include an additional page, if needed.)

Code: _____

IV. Please respond to the following statements by circling the number that best reflects your perceptions of your 1999-00 model for delivering instruction to students with learning disabilities and their peers used with targeted classes in this survey.

A. For *most* of your students with LD, using this model:

		Disagree Strongly					Agree Strongly	Don't Know or N/A
1)	Students made academic progress.	1	2	3	4	5	6	0
2)	Students mastered the Standards of Learning.	1	2	3	4	5	6	0
3)	Students used effective study skills.	1	2	3	4	5	6	0
4)	Students completed homework regularly.	1	2	3	4	5	6	0
5)	Students completed class work regularly.	1	2	3	4	5	6	0
6)	Students participated in class.	1	2	3	4	5	6	0
7)	Students appeared motivated to learn.	1	2	3	4	5	6	0
8)	Student behavior was appropriate.	1	2	3	4	5	6	0
9)	Students had appropriate social skills.	1	2	3	4	5	6	0
10)	Students attended school regularly.	1	2	3	4	5	6	0

B. If you co-taught, for *most* of your students *without* disabilities, using this model:

		Disagree Strongly					Agree Strongly	Don't Know or N/A
1)	Students made academic progress.	1	2	3	4	5	6	0
2)	Students mastered the Standards of Learning.	1	2	3	4	5	6	0
3)	Students used effective study skills.	1	2	3	4	5	6	0
4)	Students completed homework regularly.	1	2	3	4	5	6	0
5)	Students completed class work regularly.	1	2	3	4	5	6	0
6)	Students participated in class.	1	2	3	4	5	6	0
7)	Students appeared motivated to learn.	1	2	3	4	5	6	0
8)	Student behavior was appropriate.	1	2	3	4	5	6	0
9)	Students had appropriate social skills.	1	2	3	4	5	6	0
10)	Students attended school regularly.	1	2	3	4	5	6	0

Service Delivery Models
Special Education Teacher

V. Strengths and Recommendations for Improvement (Include an additional sheet, if needed.)

A. What do you believe were the most important strengths of the model you used (co-teaching and/or resource room) to instruct students with learning disabilities and their general education peers?

B. What would you recommend to improve your service delivery model?

C. If you have participated in co-teaching and worked with students receiving resource room services, which model do see better meeting the needs of students with disabilities and their general education peers?

VI. Do you have any other comments you would like to share?

Code: _____

Service Delivery Models
General Education Teacher

I. Personal Information. Please circle the responses that *best* describe you and your role *last year*, during 1999-00.

A. General education teacher:
1) Who had students with LD that leave class for special education resource room services.
2) Who co-taught with a special education teacher.
3) Who co-taught and had students with special needs served in a resource room (mixed model).

B. Grade level taught during 1999-00
1) Third
2) Fifth

C. Gender:
1) Male
2) Female

As of June 2000 :

D. Number of years you taught at the grade level listed above at this school:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years

E. Total number of years as a teacher:
1) less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years

F. Highest college degree held:
1) Bachelor's
2) Master's
3) EDS or CAGS
4) Doctorate

G. If you were co-teaching with a special educator, total number of years you co-taught:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years
5) Not applicable

H. If you were co-teaching, number of years you had co-taught with your current partner:
1) Less than 2 years
2) 2-5 years
3) 5-10 years
4) More than 10 years
5) Not applicable

Service Delivery Models
General Education Teacher

II. Class Demographics for 1999-00

Please answer the following questions based on the students in your homeroom. If you had students with disabilities who attended pullout programs, please include them in these numbers.

_____ 1. Total number of students

_____ Number of girls

_____ Number of boys

_____ 2. Number of students with IEPs

_____ 3. Number of students with learning disabilities

_____ 4. Number of students with limited English proficiency (LEP/ESL)

_____ 5. Number of students identified for Title 1, Reading Recovery, or similar services

III. Program Description

A. Please describe how your students with IEPs received their special education instruction.

1) How many special education teachers were involved with your students?
   a) One
   b) Two
   c) Three
   d) More than three

2) How many paraeducators (teacher aides) worked with your students?
   a) One
   b) Two
   c) Three
   d) More than three

3) How were services delivered?
   a) Consultation
   b) Pullout resource room
   c) Co-teaching
   d) Other _____

4) In what subjects did students receive special education?
   a) Language arts
   b) Mathematics
   c) Science
   d) Social Studies
   e) Other _____

5) If sessions were cancelled, how frequently did this occur?
   a) Often (at least once a month)
   b) Sometimes (once every one to two months)
   c) Rarely (less than once every two months)
   d) Never

6) Please describe the schedule for delivering this support? You may use a range if services varied for different students (e.g., 30-45 minutes, five times per week).

   a) Length of sessions (in minutes) _____

   b) Number of sessions per week _____

B. Please describe your planning/consultation time with special education teachers.

1) Please estimate the amount of time scheduled for planning/consulting per week.
   a) Less than fifteen minutes
   b) Fifteen to thirty minutes
   c) More than thirty minutes

2) How consistently was this schedule kept?
   a) Often (at least once a month)
   b) Sometimes (once every one to two months)
   c) Rarely (less than once every two months)
   d) Never

C. How frequently (often, sometimes, rarely, never) did you employ the following instructional arrangements during lessons in 1999-00?

		Often (daily/weekly)	Sometimes (monthly)	Rarely (less than monthly)	Never
1)	Whole group	O	S	R	N
2)	Small group	O	S	R	N
3)	Cooperative groups	O	S	R	N
4)	Peer tutoring	O	S	R	N
5)	Differentiated instruction	O	S	R	N
6)	Computer-assisted instruction	O	S	R	N
7)	Multimedia (video, audio)	O	S	R	N
8)	Lecture	O	S	R	N
9)	Independent practice	O	S	R	N

Service Delivery Models
General Education Teacher

Respond to this item only if you were co-teaching. Please circle the response that best describes the co-teaching arrangement you experienced.

1) The special education teacher assisted me, but had little involvement in instructional decisions.

2) The special education teacher worked only with students with special needs while in the class.

3) The special education teacher occasionally led the instruction for the class.

4) The special education teacher and I varied our roles and responsibilities during instruction with large and small group arrangements.

5) I often shared instructional responsibilities equally with the special education teacher.

D. Is there anything else about your model for delivering services to students with special needs you would like to share? (Include an additional sheet, if needed.)

Code: _____

IV. Please respond to the following statements by circling the number that best reflects your perceptions of your 1999-00 model (as described on page 1) for delivering instruction to students with learning disabilities and their general education peers.

A. For *most* of your students with LD , using this model:

		Disagree Strongly					Agree Strongly	Don't Know or N/A
1)	Students made academic progress.	1	2	3	4	5	6	0
2)	Students mastered the Standards of Learning.	1	2	3	4	5	6	0
3)	Students used effective study skills.	1	2	3	4	5	6	0
4)	Students completed homework regularly.	1	2	3	4	5	6	0
5)	Students completed class work regularly.	1	2	3	4	5	6	0
6)	Students participated in class.	1	2	3	4	5	6	0
7)	Students appeared motivated to learn.	1	2	3	4	5	6	0
8)	Student behavior was appropriate.	1	2	3	4	5	6	0
9)	Students had appropriate social skills.	1	2	3	4	5	6	0
10)	Students attended school regularly.	1	2	3	4	5	6	0

B. For *most* of your students without disabilities, using this model:

		Disagree Strongly					Agree Strongly	Don't Know or N/A
1)	Students made academic progress.	1	2	3	4	5	6	0
2)	Students mastered the Standards of Learning.	1	2	3	4	5	6	0
3)	Students used effective study skills.	1	2	3	4	5	6	0
4)	Students completed homework regularly.	1	2	3	4	5	6	0
5)	Students completed class work regularly.	1	2	3	4	5	6	0
6)	Students participated in class.	1	2	3	4	5	6	0
7)	Students appeared motivated to learn.	1	2	3	4	5	6	0
8)	Student behavior was appropriate.	1	2	3	4	5	6	0
9)	Students had appropriate social skills.	1	2	3	4	5	6	0
10)	Students attended school regularly.	1	2	3	4	5	6	0

Service Delivery Models
General Education Teacher

V. Strengths and Recommendations for Improvement (Include an additional sheet, if needed.)

A. What do you believe were the most important strengths of the model you used (co-teaching and/or resource room) to instruct students with learning disabilities and their general education peers?

B. What would you recommend to improve your service delivery model?

C. If you have participated in co-teaching and worked with students receiving resource room services, which model do see better meeting the needs of students with disabilities and their general education peers?

VI. Do you have any other comments you would like to share?

Student Data Spreadsheet (page 1)

School/Classroom Code _____

(computer-generated reports can be used to replace manual completion of these forms)

(Complete last 3 columns only for students with IEPs)

Student Code	Sex (m/f)	Age as of 4/1/00 (y-m)	Ethnicity C - Caucasian AA-African American H - Hispanic A - Asian O - Other	F/R Lunch	Stanford 9 Composite Fall '98 or ? or for 3rd	Years Retained	1997-98 (general ed. only, resource room, or co-taught) (could be gen. ed. teacher's name)	1998-99 (general ed. only, resource room, or co-taught) (could be gen. ed. teacher's name)	IF IEP: primary disability	Length/ frequency for special ed. services	# Years in Special Education

Stanford 9 reported as percentiles.
SOL Tests reported as scaled scores.

Student Data Spreadsheet (page 2)

School/Classroom Code _____

(Complete last 3 columns only for students with IEPs or test exemption)

Student Code	SOL English: Reading/ Literature	SOL English: Writing	SOL History & Social Science	SOL Computer/ Technology	SOL Science	Testing Accommodations Provided (yes/no)	Exempt from state assessment special education (yes/no)	Exempt from state assessment LEP (yes/no)

Appendix E

Sample Correspondence

The College Of
WILLIAM & MARY

School of Education
P.O. Box 8795
Williamsburg, VA 23187-8795

Sample Division Request Letter

Dear:

I am a doctoral candidate at The College of William & Mary in Educational Policy, Planning, and Leadership with an emphasis in special education. I would like to request permission to include ****as participants in the data collection for my dissertation research, "Standards-based Assessment and Program Efficacy: Comparing Service Delivery Models for Students with Learning Disabilities and their Peers."

I began my teaching career nearly twenty years ago as a special education teacher in Virginia. I have witnessed the changes in our service delivery over that time as a teacher, as a parent, and as a program administrator. I believe this study will provide valuable information for **** as my questions are a synthesis of those I have heard from teachers, administrators, and parents through my teaching and professional relationships with colleagues, including individuals in your division. I will be happy to share statistical information regarding assessment data collected that is disaggregated for **** sole use; however, only aggregated data collected across school divisions will be reported in my study. Confidentiality of teachers, students, schools, and school divisions is a priority. I will be happy to share the results of the dissertation with **** in any way deemed helpful.

The enclosures include an Executive Summary/Abstract, sample nomination and school request letters, sample consent letter, survey instruments, and my academic vita. My dissertation committee and The School of Education Human Subjects Review Board have approved my study. Members of my dissertation committee include Lori Korinek - chair (W&M), Chriss Walther-Thomas (W&M), Robert Hanny (W&M), Thomas Ward (W&M), and Paul Gerber (VCU).

My proposal was selected as one of forty nationwide to be recognized at the National Graduate Student Research Seminar in Educational Administration & Policy hosted by the University Council for Educational Administration (UCEA) at the Montreal American Educational Research Association (AERA) Conference in April 1999. In addition, I am pursuing outside funding that would allow greater compensation of participants.

Thank you for taking the time to consider this proposal. I would be happy to discuss any questions you should have and look forward to having the opportunity to work with your school division.

Sincerely,

Patricia A. Popp

804-559-4140 (h)
757-221-4002 (w)
E-mail: cdem4@erols.com

Enclosures

The College Of
WILLIAM & MARY

School of Education
P.O. Box 8795
Williamsburg, VA 23187-8795
Office: (757) 221-4002
FAX: (757) 221-2988

Request letter to principals/teachers

Dear:

To fulfill the requirements of my doctoral program at The College of William & Mary, I am conducting research on teacher perceptions of program efficacy (effectiveness of adopted program model) and academic achievement of students with and without disabilities in Co-Taught and traditional special education resource room/general education programs. The study will compare third and fifth grade instruction of students with special needs and their general education peers delivered together in Co-Taught classrooms or separately in special education resource rooms and general education classrooms. The study has been approved by your school division and The College of William and Mary Research Committee. In addition, my proposal was selected as one of forty nationwide to be recognized at the National Graduate Student Research Seminar in Educational Administration & Policy hosted by the University Council for Educational Administration (UCEA) at the Montreal American Educational Research Association (AERA) Conference in April 1999.

The study will involve pairs of general education and special education teachers willing to complete a questionnaire requiring approximately 30 to 45 minutes. These teams of teachers must have taught third and/or fifth graders last year (1999-2000) who were in classrooms where students with LD received their special education using one of the models referenced above. I am looking for a general education and special education teacher who worked with students from the same class. Recognizing that special education teachers work with many classes, the same special education teacher may be teamed with two general educators. A student data form providing achievement and program information for students enrolled in participating teachers' classes will be completed through your central office. This will be done without the individual students or their teachers being identified to the researcher. A copy of the school's Report Card will be requested to provide school-wide demographic information.

All responses will be kept confidential, as will your identity, and the identity of your school and your school division. Copies of the questionnaires, letter of consent, and a

summary of the research proposal are enclosed. I would appreciate it if you would share this study with teachers who meet the criteria for participation. Upon identification of interested teachers, I will provide ****** with an individual survey packet for each teacher willing to be included in the study.

I will call to discuss the study with you and answer any questions you may have during the week of March 26th. If you have any questions, please call me at (757) 221-4002 (w) or
(804) 559-4140 (h) or via e-mail at cdem4@erols.com.

Thank you for your consideration of this request.

Sincerely,

Patricia A. Popp
Doctoral Candidate
9176 Harvey Hollow Drive
Mechanicsville, VA 23116

Enclosures

Standards-Based Reform and Service Delivery Models for Students with Learning Disabilities (LD) and Their Peers

Overview

Appropriate education for students with disabilities in least restrictive environments (LREs) is highlighted in legislation and litigation. LRE is being defined more and more often in terms of access to the general education curriculum, resulting in inclusive innovations such as Co-Teaching, where special educators collaborate with general educators in meeting the needs of all students in the class. By working within the general education classroom, special educators must share general education policy concerns. Higher academic achievement is being mandated for all students, with accountability reflected in public score comparisons, personnel evaluation tied to student performance, and accreditation status (Eisner, 1995; McDonnell, McLaughlin, & Morison, 1997; Noddings, 1997). Stakeholders of Co-Teaching such as teachers, administrators, students, and parents suggest adjustments made for students with LD can be beneficial to all students, especially those who have experienced difficulty (Gerber, 1996; Walther-Thomas, 1997). However, counter concerns that meeting the needs of students with disabilities leads to a watered-down, slower-paced curriculum are voiced as well (Gerber, 1996; Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998).

Research on the impact of inclusive programming and standards-based reform has been limited (Boudah, Schumacher, & Deshler, 1997; Klingner et al., 1998; McDonnell et al., 1997). Additional concerns of extant research include small sample sizes, lack of comparison groups, and lack of valid and reliable measurement tools to assess student progress. Nevertheless, the performance impact of co-teaching or pullout resource room special education programs for all students on high-stakes assessments becomes a critical question when schools and teachers are held accountable (Shanker, 1995; Staub & Peck, 1995). Are students with disabilities included in the assessments and are opportunities to learn available (Elliott, Ysseldyke, Thurlow, & Erickson, 1998)? Are students with LD making adequate progress in either model? Does Co-Teaching enrich or hinder the performance of students without disabilities in the class? How effectively do teachers believe they are able to meet student needs when employing these models?

This study will use service delivery models as the independent variable to compare performance on Virginia's Standards of Learning (SOL) assessments and teacher perceptions of program efficacy in third and fifth grade Co-Taught classes and resource room pullout classes along with the general education classes from which students with LD are pulled.

Study Procedures

Limited to Virginia, the focus of the proposed study will be third- and fifth-grade general and special education teachers and their students. Central office personnel knowledgeable of the local school division special education programs will be asked to nominate potential schools for participation. A copy of the School Report Card will be requested for schoolwide demographic information. Teachers will be asked to complete questionnaires and open-ended questions to obtain efficacy data. The estimated time commitment for questionnaire completion is 30 to 45 minutes. Data for students will provided through central office databases and include demographics, prior achievement, and the results of Virginia's standards-based assessment, the SOL Tests. Prior achievement

scores will be used to identify the subgroups of students without disabilities as below-average, average, and above-average and as a covariate in achievement analyses.

Research Questions

The following research questions are proposed. Explanations of the potential applicability of the information collected have been added in italics.

Question 1. What are teacher perceptions of program efficacy for the current models they use to provide instruction? What do teachers perceive as strengths of their current models and what suggestions do they have for improving service delivery?

Teacher insights can be used in shaping program improvement, determining future professional development needs, and informing decisions related to content of teacher preparation courses in higher education.

Question 2. What percentage of all students with LD in the selected classrooms is: (a) exempt from standardized testing; (b) tested with modifications; and (c) tested using standard administration? Does this vary between resource room classes and Co-Taught classes?

IDEA requires that all students with disabilities be included in state and local accountability systems. The information from these questions can be used to explore how effectively different models provide such access.

Question 3.

A. Are there differential outcomes in student achievement as reflected in pass rates and scaled scores on the third- and fifth-grade SOL Tests for students labeled learning disabled, below-average, average, or above-average that correlate with the models of special education service delivery in use?

   By analyzing subgroups of students, the potential impact of service delivery models on students for whom passing the SOL assessment may be a challenge can be explored. Secondly, for students with higher achievement, this analysis begins to address the concern that inclusive programs may have a negative impact on curriculum and instruction for high achievers.

B. How does student performance on prior achievement assessments correlate with the same students' performance on the Virginia SOL Tests? Does the correlation of student performance on prior achievement assessments with the same students' performance on the Virginia SOL Tests vary by subgroup of students?

   This information may help inform decisions based on previous testing that target students for remediation to support SOL assessment performance. (e.g., How well do our previous assessments match performance on the SOL? What decisions can we make about which students should be targeted for support based on prior test data?)

Appendix F

Detail on Teacher Reporting of Frequency of Instructional Arrangements by Setting

Table F1

Response Rates for Frequency of Instructional Arrangement Use

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Whole grp * Setting	24	80.0%	6	20.0%	30	100.0%
Small grp * Setting	24	80.0%	6	20.0%	30	100.0%
Cooperative * Setting	22	73.3%	8	26.7%	30	100.0%
Peer tutor * Setting	22	73.3%	8	26.7%	30	100.0%
Differentiated * Setting	22	73.3%	8	26.7%	30	100.0%
Computer * Setting	22	73.3%	8	26.7%	30	100.0%
Multi-media * Setting	22	73.3%	8	26.7%	30	100.0%
Lecture * Setting	22	73.3%	8	26.7%	30	100.0%
Independent * Setting	24	80.0%	6	20.0%	30	100.0%

Table F2

Frequency of Instructional Arrangement Use by Setting

			Setting			Total
			General Ed Class	Resource Room	Co-Taught	
Whole grp	Often	Count	9	3	9	21
		% within Whole grp	42.9%	14.3%	42.9%	100.0%
		% within Setting	100.0%	75.0%	81.8%	87.5%
	Sometimes	Count			2	2
		% within Whole grp			100.0%	100.0%
		% within Setting			18.2%	8.3%
	Rarely	Count		1		1
		% within Whole grp		100.0%		100.0%
		% within Setting		25.0%		4.2%
Total		Count	9	4	11	24
		% within Whole grp	37.5%	16.7%	45.8%	100.0%

Small grp	Often	Count	5	4	7	16
		% within Small grp	31.3%	25.0%	43.8%	100.0%
		% within Setting	55.6%	100.0%	63.6%	66.7%
	Sometimes	Count	3		4	7
		% within Small grp	42.9%		57.1%	100.0%
		% within Setting	33.3%		36.4%	29.2%
	Rarely	Count	1			1
		% within Small grp	100.0%			100.0%
		% within Setting	11.1%			4.2%
Total		Count	9	4	11	24
		% within Small grp	37.5%	16.7%	45.8%	100.0%

Continued

Table F2 (continued)

Frequency of Instructional Arrangement Use by Setting

			Setting			Total
			General Ed Class	Resource Room	Co-Taught	
Cooperative	Often	Count	5	2	9	16
		% within Cooperative	31.3%	12.5%	56.3%	100.0%
		% within Setting	55.6%	100.0%	81.8%	72.7%
	Sometimes	Count	3		2	5
		% within Cooperative	60.0%		40.0%	100.0%
		% within Setting	33.3%		18.2%	22.7%
	Rarely	Count	1			1
		% within Cooperative	100.0%			100.0%
		% within Setting	11.1%			4.5%
Total		Count	9	2	11	22
		% within Cooperative	40.9%	9.1%	50.0%	100.0%

Peer tutor	Often	Count	3	1	2	6
		% within Peer tutor	50.0%	16.7%	33.3%	100.0%
		% within Setting	33.3%	50.0%	18.2%	27.3%
	Sometimes	Count	3	1	6	10
		% within Peer tutor	30.0%	10.0%	60.0%	100.0%
		% within Setting	33.3%	50.0%	54.5%	45.5%
	Rarely	Count	3		3	6
		% within Peer tutor	50.0%		50.0%	100.0%
		% within Setting	33.3%		27.3%	27.3%
Total		Count	9	2	11	22
		% within Peer tutor	40.9%	9.1%	50.0%	100.0%

Differentiated	Often	Count	4	2	4	10
		% within Differentiated	40.0%	20.0%	40.0%	100.0%
		% within Setting	44.4%	100.0%	36.4%	45.5%
	Sometimes	Count	5		7	12
		% within Differentiated	41.7%		58.3%	100.0%
		% within Setting	55.6%		63.6%	54.5%
Total		Count	9	2	11	22
		% within Differentiated	40.9%	9.1%	50.0%	100.0%

continued

Table F2 (continued)

Frequency of Instructional Arrangement Use by Setting

			Setting			Total
			General Ed Class	Resource Room	Co-Taught	
Computer	Often	Count		2		2
		% within Computer		100.0%		100.0%
		% within Setting		100.0%		9.1%
	Sometimes	Count	5		8	13
		% within Computer	38.5%		61.5%	100.0%
		% within Setting	55.6%		72.7%	59.1%
	Rarely	Count	4		2	6
		% within Computer	66.7%		33.3%	100.0%
		% within Setting	44.4%		18.2%	27.3%
	Never	Count			1	1
		% within Computer			100.0%	100.0%
		% within Setting			9.1%	4.5%
Total		Count	9	2	11	22
		% within Computer	40.9%	9.1%	50.0%	100.0%

Multi-media	Often	Count	1		1	2
		% within Multi-media	50.0%		50.0%	100.0%
		% within Setting	11.1%		9.1%	9.1%
	Sometimes	Count	5	2	6	13
		% within Multi-media	38.5%	15.4%	46.2%	100.0%
		% within Setting	55.6%	100.0%	54.5%	59.1%
	Rarely	Count	3		3	6
		% within Multi-media	50.0%		50.0%	100.0%
		% within Setting	33.3%		27.3%	27.3%
	Never	Count			1	1
		% within Multi-media			100.0%	100.0%
		% within Setting			9.1%	4.5%
Total		Count	9	2	11	22
		% within Multi-media	40.9%	9.1%	50.0%	100.0%

Lecture	Often	Count	7	1	7	15
		% within Lecture	46.7%	6.7%	46.7%	100.0%
		% within Setting	77.8%	50.0%	63.6%	68.2%
	Sometimes	Count	1		4	5
		% within Lecture	20.0%		80.0%	100.0%
		% within Setting	11.1%		36.4%	22.7%
	Rarely	Count		1		1
		% within Lecture		100.0%		100.0%
		% within Setting		50.0%		4.5%
	Never	Count	1			1
		% within Lecture	100.0%			100.0%
		% within Setting	11.1%			4.5%
Total		Count	9	2	11	22
		% within Lecture	40.9%	9.1%	50.0%	100.0%

continued

Table F2 (continued)

Frequency of Instructional Arrangement Use by Setting

			Setting			Total
			General Ed class	Resource Room	Co-Taught	
Independent	Often	Count	9	1	9	19
		% within Independent	47.4%	5.3%	47.4%	100.0%
		% within Setting	100.0%	25.0%	81.8%	79.2%
	Sometimes	Count		3	2	5
		% within Independent		60.0%	40.0%	100.0%
		% within Setting		75.0%	18.2%	20.8%
Total		Count	9	4	11	24
		% within Independent	37.5%	16.7%	45.8%	100.0%
		% within Setting	100.0%	100.0%	100.0%	100.0%

Table F3

Descriptive Statistics for Instructional Arrangements by Setting

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Whole grp * Setting	24	80.0%	6	20.0%	30	100.0%
Small grp * Setting	24	80.0%	6	20.0%	30	100.0%
Cooperative * Setting	22	73.3%	8	26.7%	30	100.0%
Peer tutor * Setting	22	73.3%	8	26.7%	30	100.0%
Differentiated * Setting	22	73.3%	8	26.7%	30	100.0%

Setting		Whole grp	Small grp	Cooperative	Peer tutor	Differentiated
General Ed class	Mean	1.00	1.56	1.56	2.00	1.56
	N	9	9	9	9	9
	Std. Deviation	.00	.73	.73	.87	.53
	Median	1.00	1.00	1.00	2.00	2.00
	% of Total N	37.5%	37.5%	40.9%	40.9%	40.9%
Resource Room	Mean	1.50	1.00	1.00	1.50	1.00
	N	4	4	2	2	2
	Std. Deviation	1.00	.00	.00	.71	.00
	Median	1.00	1.00	1.00	1.50	1.00
	% of Total N	16.7%	16.7%	9.1%	9.1%	9.1%
Co-Taught	Mean	1.18	1.36	1.18	2.09	1.64
	N	11	11	11	11	11
	Std. Deviation	.40	.50	.40	.70	.50
	Median	1.00	1.00	1.00	2.00	2.00
	% of Total N	45.8%	45.8%	50.0%	50.0%	50.0%
Total	Mean	1.17	1.38	1.32	2.00	1.55
	N	24	24	22	22	22
	Std. Deviation	.48	.58	.57	.76	.51
	Median	1.00	1.00	1.00	2.00	2.00

Note. 1=often (daily/weekly), 2=sometimes (monthly), 3=rarely (less than monthly), 4=never.

continued

Table F3 (continued)

Descriptive Statistics for Instructional Arrangements by Setting

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Computer * Setting	22	73.3%	8	26.7%	30	100.0%
Multi-media * Setting	22	73.3%	8	26.7%	30	100.0%
Lecture * Setting	22	73.3%	8	26.7%	30	100.0%
Independent * Setting	24	80.0%	6	20.0%	30	100.0%

Setting		Computer	Multimedia	Lecture	Independent
General Ed Class	Mean	2.44	2.22	1.44	1.00
	N	9	9	9	9
	Std. Deviation	.53	.67	1.01	.00
	Median	2.00	2.00	1.00	1.00
	% of Total N	40.9%	40.9%	40.9%	37.5%
Resource Room	Mean	1.00	2.00	2.00	1.75
	N	2	2	2	4
	Std. Deviation	.00	.00	1.41	.50
	Median	1.00	2.00	2.00	2.00
	% of Total N	9.1%	9.1%	9.1%	16.7%
Co-Taught	Mean	2.36	2.36	1.36	1.18
	N	11	11	11	11
	Std. Deviation	.67	.81	.50	.40
	Median	2.00	2.00	1.00	1.00
	% of Total N	50.0%	50.0%	50.0%	45.8%
Total	Mean	2.27	2.27	1.45	1.21
	N	22	22	22	24
	Std. Deviation	.70	.70	.80	.41
	Median	2.00	2.00	1.00	1.00
	% of Total N	100.0%	100.0%	100.0%	100.0%

Note. 1=often (daily/weekly), 2=sometimes (monthly), 3=rarely (less than monthly), 4=never.

Appendix G

Detail for Teacher Perceptions of Model Strengths and Recommendations for Improvement

Themes subthemes	Direct Transcription of Quotes Regular print – general educator, resource *Italics – general educator, co-taught or mixed models* **Bold – special educator, resource** ***Bold & itlaics - special educator, co-taught or mixed models***
Model based on student readiness Weak need pullout c-t if ready accom/mod acceptable not changing curriculum status quo	The "pull-out" or self-contained setting was best for the majority of these students because their instructional levels were significantly below that of the remainder of the group. It's a strength to pull out students who have disabilities which prevent them from keeping the pace with their general education peers. **I was able to truly remediate those students who were not academically ready for the mainstream by putting them into resource setting** It depends on the group and abilities of the child. Stronger LD students greatly benefit from co-teaching while weaker students fare better in a resource room. I have participated in co-teaching as well as having students receive resource room services. There are positives to each program. If a student is slightly behind, co-teaching works well. If the student is more than a year below grade level, "pull out" is the best solution for the student. ***This depends on the student's needs. If the disabilities are more moderate a resource room may be more appropriate.*** *It would depend on the needs of the LD student. If the student was way below grade level in reading, a resource room that could address phonics instruction would be a better fit for reading progress.. Students with special needs need more individualized instruction that is difficult to do within the regular classroom.* *It depends on the degree of disability. If severe, the pullout model is necessary. But the co-teaching model is more effective if the child is on, or close to, grade level and can function within a heterogeneous classroom.* ***It depends on the student. If they are below the grade level, then pull-out instruction is more appropriate since they need instruction on another grade level. If they are working on or very near grade level & mostly need accommodations & modifications collab. Is more appropriate.*** It also relieves the general education teacher from making modifications to teach the wide range of learning abilities.

	Children with specific L. D. problems left the class for Language Arts and Math. I was able to teach the curriculum without modifications. *Co-taught classes are for children who are ready to leave the resource room. By this time they should be able to function well in the classroom with strong support from an LD teacher.* *If students are close to grade level in reading, I think the co-taught class challenges and motivates students as well as providing examples of appropriate responses and thinking processes involved in learning.* **Collaborative teaching for kids on level.** *I feel that the LD collab (co-taught) model can truly provide a meaningful, positive learning environment for students with mild learning differences/challenges.* The most important strength was that each child was being taught on their level. They were challenged without being frustrated and were able to take pride in their accomplishments. The resource room provided a small-group setting where students could receive more frequent personalized instruction and instruction that was more appropriate to their needs. The students who were pulled out received instruction based on their instructional level. When pulled out, students were to receive the personalized attention they required to become successful. I was able to give general education students more attention where needed as well. *I think the model needs to be determined based on the needs of the individual student.* *This is not a question that can be answered without reviewing individual case needs. Each model has merit, but must be based upon the individual's needs, not the desires of a school system.* *The models should be varied according to the needs of the children. Each model has value and merit in remediating and meeting the individual needs of each child. We should have models that work for the children, not the County!* ***Not a black-white question (one over other --) This must be answered on a case-by-case and caseload by caseload basis –*** **Obviously a student that can perform grade level work with some accommodations should be served in a co-taught classroom.**

Instruction and Teacher Roles Behavior Strategies Grouping (s-t ratio) Differentiation	***In addition, we were able to differentiate whole and small group instruction in the classroom.*** The resource room provided a small-group setting where students could receive more frequent personalized instruction *The LD teacher daily checked up on each LD student to make sure homework & classwork was completed correctly.* Small group instruction enables students to excel where a large group setting may hinder their progress. There is more one-on-one. **Using manipulatives during math class was always a strength because children learn what they can see. One on one instruction was also effective. Having small groups made the classes easier to manage and easier to zero in on a students difficulty in learning.** *Allowed more flexibility in teaching in varied ways (grouping, etc.).* *Monitoring and redirecting occurred more frequently.* ***All students received strategies. Two teachers giving instruction within the classroom. More individual attention for <u>all</u> students.*** ***We were able to do more small group and individualized instruction and taiior lessons to specific weaknesses.*** *Our children received tremendous support from the special education teacher in both models. Their instruction and strategies were beneficial to both the LD and non-identified LD students* *Our children had tremendous support from the LD teachers in both models. Their instruction/strategies also benefited the non-LD students as well.* *I would like to have more small group learning, with most children doing novel studies often instead of occasionally. We were bound by county standards of staying with the Hartcourt Brace text which prevented more novel studies. I would like to use more small group instruction within the Hartcourt Brace parameters.* General education students also benefit from co-teaching, as there are two thinking minds and 2 sets of hands and eyes. Social Studies and Science was the problem. These children remained in the classroom without an aide. They did get special study guides but it was difficult for them. They left the classroom for the resource room to take their tests. I feel they received too much help.

	I do not feel that co-taught classroom worked well for writing (the students left for resource but I am teaching in a co-taught class this year). **Also general Ed. teachers have the opportunity to use strategies with her students from the L.D. teacher.** Co-teaching at 5th grade was a very satisfactory arrangement for writing skills. They L. D. teacher came in daily for 30 minutes helping her students and classroom students too. Those L.D. students did not miss the important classroom instruction and they had their support system for organizational instruction. **while another LD teacher worked in co-taught in 3 classes housing those LD students needing that model.** *We shared responsibility* *Opportunities were endless with another teacher in the room. Allowed more flexibility in teaching in varied ways (grouping, etc.). Support was greater, also, in parent conferences. Monitoring and redirecting occurred more frequently.* More direction from special ed. teacher. **LD teachers should remediate academics; teach strategies, advocate & assist per individual student needs.** ***Since the general ed teacher often sees the children for more of the day their expectations of the students need to be very clear. Their understanding of students' strengths and weaknesses also needs to be clear so they can help the ld child feel part of the classroom.*** *The co-teaching model was helpful to me because I had an expert in my room to bounce ideas off of, to offer perceptions of students and to help me find creative ways to meet the needs of <u>all</u> my students.* ***The teacher and I planned together regularly.*** *The co-teaching model was helpful to me because I had an expert in my room to bounce ideas off of, to offer perceptions of students and to help me find creative ways to meet the needs of <u>all</u> my students.* **Because grouping is so small individual skills can be taught.**

Student Achievement Modeling individual attention exposure & mastery of curriculum	*I feel the students (LD) met goals; however, the rate of progress may have been increased had the LD collab teacher been able to stay in class longer than 1 hour daily. The students truly need more than 1 hr of support daily.* ***Having two teachers we were able to monitor student progress more closely. In addition peer models are important for strengthening the skills of the LD students.*** ***This model prepared the children for middle school instruction models.*** ***The disabled students were exposed to and mastered a lot of the general ed curriculum.*** Small group instruction enables students to excel where a large group setting may hinder their progress. When pulled out, students were to receive the personalized attention they required to become successful. I was able to give general education students more attention where needed as well. I feel co-teaching is beneficial for all the students in the classroom. *If students are close to grade level in reading, I think the co-taught class challenges and motivates students as well as providing examples of appropriate responses and thinking processes involved in learning.* *I felt the general ed. students also benefit from 2 teachers in a co-taught classroom* Co-teaching is excellent! I taught collab this school year, 2000 – 01. I loved it and my students made so much progress with two of us to help with learning. *In the regular ed classroom the students (LD) are given models (other students) with strong work/study skills and class participation.* ***Co-teaching was most effective.*** ***When looking long term I think collab is more beneficial.*** **Majority of students this year began at a higher than average resource level and for majority of student this year there is good family support.**

RESOURCES	
Staffing s-t ratio expanded support in classes either c-t or aide too much clerical	*The LD staff worked beyond expectations and were most supportive to the regular classroom teacher, especially given the number of students serviced by so few LD specialists.* *The dedication of our LD staff was immeasurable. They have gone over and above expectations, especially since there are so few of them and so many children to be serviced.* **where <u>they</u> fit, and not where we have to put them when we don't have an adequate number of LD teachers and paraprofessionals to do justice to their education – i.e. this year we are so overloaded and I'll bet our scores plummet.** I would recommend a lower student teacher ratio. Also, a full time aide to assist the teacher would be beneficial. Social Studies and Science was the problem. These children remained in the classroom without an aide. They did get special study guides but it was difficult for them. They left the classroom for the resource room to take their tests. I feel they received too much help. Collab math in third grade **I would recommend the use of an aide all day long and also working with less children at a time.** *The special ed. case load is tremendous and their work load paramount for the low staffing is provided by our school system. Additional LD instructors would help alleviate the astronomical amount of work required by these teacher. There <u>must</u> be a change in the pupil/teacher ratio in order to better service the <u>children's</u> needs.* *There <u>has to be change</u> in the number of students on each LD teacher's case load. It is unrealistic and detrimental to the academic growth of these identified children when they are in a group of <u>20</u> with one teacher! Scores will go down!!* ***Adequate LD staff. Our weighted count is tremendous this year, & we have received no extra personnel to adequately meet the needs this year. Last year it was very do-able & that makes a tremendous difference. We could NOT co-teach this year due to high numbers and severe needs.*** More L. D. teachers with flexible schedules and less clerical work. Aides should be assigned to children whose IEP indicate they need help with comprehension in academic areas of Social Studies and Science.

	The most important factor is teacher/student ratio. The frustration of the various models are directly responsible for my switch (after 12 years) beck to regular education. If the special educator for co-teaching is in the classroom daily for all subjects, the model could work. However, allotting only _ -- 1 _ hours per day and leaving the special ed. students in the general ed. population puts a strain on all involved, the students and the teacher. Pull out would be better under such conditions. A paraprofessional came into my room to assist a few LD math students who were not pulled out in a self-contained setting. Because it was not every day and she walked in "cold" each time it was not especially effective. *more LD teachers; less paperwork; clerical assistants assigned ONLY to LD staff* *more LD teachers! Less paperwork! More clerical help for LD Staff; Realistic # of children assigned to LD Teachers.* **Yes – but I have other paperwork piled high – I just wish LD students could have adequate & trained staff! Thanks for any help you can give them –** **The major strength I see is being able to serve students where they fit, and not where we have to put them when we don't have an adequate number of LD teachers and paraprofessionals to do justice to their education –** We tried to meet one afternoon each week, but scheduling was difficult. *I feel the students (LD) met goals; however, the rate of progress may have been increased had the LD collab teacher been able to stay in class longer than 1 hour daily. The students truly need more than 1 hr of support daily.* ***Some students need more support in other classes such as science and social studies. It is difficult to serve some of the children with greater needs with the current amount of time allotted.*** *however, the rate of progress may have been increased had the LD collab teacher been able to stay in class longer than 1 hour daily. The students truly need more than 1 hr of support daily* *Increased collaborative instruction time*

Student Grouping	Groups of less than 6 for resource classes. To cluster 6 students with significant learning disabilities in a class of 22 is not effective. Considering that LD is often found in conjunction with ADHD, motivation, & organizational issues. They might receive better instructional attention form regular educators if they were spread out more. One year I taught a regular ed class of 21 with 18 LD students! **Resource room teaching should be no more than 8 to a class otherwise the concept of resource room teaching is defeated.** Mainstreaming for social studies and science might be more beneficial to the learning disabled students if they were mainstreamed in a co-taught classroom. They are more likely to receive the one-on-one teacher instruction they need more frequently. However, this places high demands on those two teachers, so it may not be practical. **Classroom size (numbers) should be considered – a class of 24 students should not have 7 L. D. students in that class. These students should be distributed evenly across the grade level.**
Teacher Training All responses here co-teach	*The teaching skills and interpersonal skills of all parties involved are very important.* ***On-going teacher training is also important to keep the service delivery model successful.*** ***More time for staff development in strategies.*** *I would recommend training for general ed. teachers related to collaborative teaching and special ed. students. I would also suggest additional training in reading instruction for all teachers.*
Planning important lacking	Planning for language arts was often done as a team. Planning for math consisted of quick conferences and sharing of lesson plans & tests. *Planning time was difficult to "find" due to varied responsibilities involved in general educational (team planning, meetings, paper work, etc.)* Planning with regular teachers/grade level teams to assure that expectations paralleled those for regular ed students. ***We had planning and supplies.*** *An extra duty-free planning period for co-teachers of one hour per week at the very minimum!*

	More planning time!! ***<u>Planning is essential!</u>*** ***More regular ed teacher and LD teacher planning time.*** Special ed. teachers, both co-teaching and pull-out, must plan with the general ed. teachers to have a sound understanding of what their students are studying. It would be easier to support the special ed. student in mainstreamed content areas. A paraprofessional came into my room to assist a few LD math students who were not pulled out in a self-contained setting. Because it was not every day and she walked in "cold" each time it was not especially effective.
Affective/ Social student teacher	Parents are concerned about their special ed. students going to middle school. They should be included in all steps to ease their worries. ***This was an opportunity for disabled learners to remain in the general ed. classroom and experience success.*** *The students w/o disabilities didn't perceive a difference between students that I was aware of.* **In the co-taught classroom, the special ed teacher (me) did not single out spec. ed children alone for help. General ed. kids were also helped at the same time. Often children in the class did not know who the LD children were.** ***All L.D. students felt included and not isolated.*** Students have opportunities to interact with peers at same level. Pull-out students feel removed from the general education population, and the co-taught students do not. ***We wanted to do it. The kids wanted to be in the classroom. I didn't want to use SOL scores to determine if it was a success or not. It was so much more than that.*** ***I had a <u>very</u> split group of LD students last year. Some were <u>very</u> motivated and then a few who showed little motivation. I feel the role of the general educators is a big motivator in how much effort the LD students put forth in addition to the home experiences.*** **The general ed. classroom exposes these students to socialization, the curriculum, and activities that they need to see.** *The teaching skills <u>and</u> interpersonal skills of all parties involved are <u>very</u> important.*

	Coteaching was a wonderful experience for me. I think a lot depends on the relationship between the two teachers as far as the success of the model. As a former special educator at the middle school level, I found that the success of the delivery model is very dependent upon the qualities of the educators involved and the mix of students. I found that classes ranged from ineffective and enabling to very successful. ***I think the collaborative model works best when the two teachers collaborating share the same goals for the regular ed and learning disabled students.***
Extra Description	There were several delivery models at work: 1. Five students were served in resource or "pull out" written language. 2. Two students were served in resource or "pull out" math. 3. Four of the students (above) also went to a second special educator for math support for 20-30 minutes several mornings each week. They then returned to my class for math, and on several mornings a paraprofessional came into my class. Three of my students were consultation students who were highly motivated and very capable. They really needed little help from the L.D. program. Four of the students met daily for their specific needs with L.D. services provided either for Math, Language Arts, or both. Three of my students were consultation students who were highly motivated and very capable. They really needed little help from the L.D. program. Four of the students met daily for their specific needs with L.D. services provided either for Math, Language Arts, or both.

Appendix H

Detail on Teacher Ratings of Program Efficacy for Students with LD and Their Peers

Table H1

Descriptive Statistics for Performance of Students With and Without LD (Without Model)

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Academic progress * With or Without LD	48	80.0%	12	20.0%	60	100.0%
SOL progress * With or Without LD	47	78.3%	13	21.7%	60	100.0%
Study skills * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Homework * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Classwork * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Participation * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Motivation * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Behavior * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Social skills * With or Without LD	48	80.0%	12	20.0%	60	100.0%
Attendance * With or Without LD	48	80.0%	12	20.0%	60	100.0%

With or Without LD		Academic progress	SOL progress	Study skills	Homework	Classwork
Without LD	Mean	5.55	5.52	5.00	5.05	5.50
	N	22	21	22	22	22
	Std. Deviation	.51	.60	.76	.79	.60
	Median	6.00	6.00	5.00	5.00	6.00
	% of Total N	45.8%	44.7%	45.8%	45.8%	45.8%
With LD	Mean	5.08	4.00	4.08	4.38	4.92
	N	26	26	26	26	26
	Std. Deviation	.98	1.44	1.20	1.30	1.13
	Median	5.00	4.00	4.00	4.50	5.00
	% of Total N	54.2%	55.3%	54.2%	54.2%	54.2%
Total	Mean	5.29	4.68	4.50	4.69	5.19
	N	48	47	48	48	48
	Std. Deviation	.82	1.37	1.11	1.13	.96
	Median	5.00	5.00	4.50	5.00	5.00

continued

Table H1 (continued)

Descriptive Statistics for Performance of Students With and Without LD (Without Model)

With or Without LD		Participation	Motivation	Behavior	Social skills	Attendance
Without LD	Mean	5.41	5.09	5.00	5.18	5.68
	N	22	22	22	22	22
	Std. Deviation	.50	.68	.62	.39	.48
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	45.8%	45.8%	45.8%	45.8%	45.8%
With LD	Mean	4.92	4.69	4.92	4.85	5.65
	N	26	26	26	26	26
	Std. Deviation	.98	.93	.84	1.01	.67
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	54.2%	54.2%	54.2%	54.2%	54.2%
Total	Mean	5.15	4.88	4.96	5.00	5.67
	N	48	48	48	48	48
	Std. Deviation	.82	.84	.74	.80	.59
	Median	5.00	5.00	5.00	5.00	6.00

Table H2

Descriptive Statistics for Performance of Students With and Without LD by Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Academic progress * Student&Model	48	80.0%	12	20.0%	60	100.0%
SOL progress * Student&Model	47	78.3%	13	21.7%	60	100.0%
Study skills * Student&Model	48	80.0%	12	20.0%	60	100.0%
Homework * Student&Model	48	80.0%	12	20.0%	60	100.0%
Classwork * Student&Model	48	80.0%	12	20.0%	60	100.0%
Participation * Student&Model	48	80.0%	12	20.0%	60	100.0%
Motivation * Student&Model	48	80.0%	12	20.0%	60	100.0%
Behavior * Student&Model	48	80.0%	12	20.0%	60	100.0%
Social skills * Student&Model	48	80.0%	12	20.0%	60	100.0%
Attendance * Student&Model	48	80.0%	12	20.0%	60	100.0%

continued

Table H2 (continued)

Descriptive Statistics for Performance of Students With and Without LD by Model

Student&Model		Academic progress	SOL progress	Study skills	Homework	Classwork
Without disabilities Resource	Mean	5.38	5.14	4.75	4.88	5.50
	N	8	7	8	8	8
	Std. Deviation	.52	.38	.46	.83	.53
	Median	5.00	5.00	5.00	5.00	5.50
	% of Total N	16.7%	14.9%	16.7%	16.7%	16.7%
Without disabilities Co-Taught	Mean	5.64	5.71	5.14	5.14	5.50
	N	14	14	14	14	14
	Std. Deviation	.50	.61	.86	.77	.65
	Median	6.00	6.00	5.00	5.00	6.00
	% of Total N	29.2%	29.8%	29.2%	29.2%	29.2%
With LD Co-Taught	Mean	5.57	4.50	4.36	4.64	5.00
	N	14	14	14	14	14
	Std. Deviation	.65	.92	1.28	1.34	1.36
	Median	6.00	4.00	4.00	5.00	5.00
	% of Total N	29.2%	29.8%	29.2%	29.2%	29.2%
With LD Resource	Mean	4.50	3.42	3.75	4.08	4.83
	N	12	12	12	12	12
	Std. Deviation	1.00	1.73	1.06	1.24	.83
	Median	5.00	3.50	4.00	4.00	5.00
	% of Total N	25.0%	25.5%	25.0%	25.0%	25.0%
Total	Mean	5.29	4.68	4.50	4.69	5.19
	N	48	47	48	48	48
	Std. Deviation	.82	1.37	1.11	1.13	.96
	Median	5.00	5.00	4.50	5.00	5.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%

continued

Table H2 (continued)

Descriptive Statistics for Performance of Students With and Without LD by Model

Student&Model		Participation	Motivation	Behavior	Social skills	Attendance
Without disabilities resource	Mean	5.38	4.75	4.63	5.00	5.63
	N	8	8	8	8	8
	Std. Deviation	.52	.89	.52	.00	.52
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	16.7%	16.7%	16.7%	16.7%	16.7%
Without disabilities Co-Taught	Mean	5.43	5.29	5.21	5.29	5.71
	N	14	14	14	14	14
	Std. Deviation	.51	.47	.58	.47	.47
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	29.2%	29.2%	29.2%	29.2%	29.2%
With LD Co-Taught	Mean	5.21	5.07	5.07	5.07	5.79
	N	14	14	14	14	14
	Std. Deviation	.80	.62	1.00	1.00	.38
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	29.2%	29.2%	29.2%	29.2%	29.2%
With LD resource	Mean	4.58	4.25	4.75	4.58	5.50
	N	12	12	12	12	12
	Std. Deviation	1.08	1.06	.62	1.00	.90
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	25.0%	25.0%	25.0%	25.0%	25.0%
Total	Mean	5.15	4.88	4.96	5.00	5.67
	N	48	48	48	48	48
	Std. Deviation	.82	.84	.74	.80	.59
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%

Table H3

Descriptive Statistics for Performance of Students Without LD by Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Participation * Model	22	36.7%	38	63.3%	60	100.0%
Motivation * Model	22	36.7%	38	63.3%	60	100.0%
Behavior * Model	22	36.7%	38	63.3%	60	100.0%
Social skills * Model	22	36.7%	38	63.3%	60	100.0%
Attendance * Model	22	36.7%	38	63.3%	60	100.0%
Academic progress * Model	22	36.7%	38	63.3%	60	100.0%
SOL progress * Model	21	35.0%	39	65.0%	60	100.0%
Study skills * Model	22	36.7%	38	63.3%	60	100.0%
Homework * Model	22	36.7%	38	63.3%	60	100.0%
Classwork * Model	22	36.7%	38	63.3%	60	100.0%

Model		Participation	Motivation	Behavior	Social skills	Attendance
Resource	Mean	5.38	4.75	4.63	5.00	5.63
	N	8	8	8	8	8
	Std. Deviation	.52	.89	.52	.00	.52
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	36.4%	36.4%	36.4%	36.4%	36.4%
Co-Teaching	Mean	5.43	5.29	5.21	5.29	5.71
	N	14	14	14	14	14
	Std. Deviation	.51	.47	.58	.47	.47
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	63.6%	63.6%	63.6%	63.6%	63.6%
Total	Mean	5.41	5.09	5.00	5.18	5.68
	N	22	22	22	22	22
	Std. Deviation	.50	.68	.62	.39	.48
	Median	5.00	5.00	5.00	5.00	6.00

Model		Academic progress	SOL progress	Study skills	Homework	Classwork
Resource	Mean	5.38	5.14	4.75	4.88	5.50
	N	8	7	8	8	8
	Std. Deviation	.52	.38	.46	.83	.53
	Median	5.00	5.00	5.00	5.00	5.50
	% of Total N	36.4%	33.3%	36.4%	36.4%	36.4%
Co-Teaching	Mean	5.64	5.71	5.14	5.14	5.50
	N	14	14	14	14	14
	Std. Deviation	.50	.61	.86	.77	.65
	Median	6.00	6.00	5.00	5.00	6.00
	% of Total N	63.6%	66.7%	63.6%	63.6%	63.6%
Total	Mean	5.55	5.52	5.00	5.05	5.50
	N	22	21	22	22	22
	Std. Deviation	.51	.60	.76	.79	.60
	Median	6.00	6.00	5.00	5.00	6.00

Table H4

Descriptive Statistics for Performance of Students With LD by Teacher Role and Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
LD academic progress * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD SOL progress * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD study skills * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD homework * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD classwork * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD participation * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD motivation * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD behavior * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD social skills * Teacher/Model	26	86.7%	4	13.3%	30	100.0%
LD attendance * Teacher/Model	26	86.7%	4	13.3%	30	100.0%

Teacher/Model		LD academic progress	LD SOL progress	LD study skills	LD homework	LD classwork
General Ed Resource	Mean	4.25	3.25	3.63	4.13	4.87
	N	8	8	8	8	8
	Std. Deviation	1.16	1.67	1.30	1.55	.99
	Median	4.50	3.50	3.50	5.00	5.00
	% of Total N	30.8%	30.8%	30.8%	30.8%	30.8%
General Ed Co-Taught	Mean	5.38	4.63	4.13	4.50	4.75
	N	8	8	8	8	8
	Std. Deviation	.74	1.19	1.46	1.60	1.58
	Median	5.50	4.00	4.00	5.00	5.00
	% of Total N	30.8%	30.8%	30.8%	30.8%	30.8%
Special Ed Resource	Mean	5.00	3.75	4.00	4.00	4.75
	N	4	4	4	4	4
	Std. Deviation	.00	2.06	.00	.00	.50
	Median	5.00	3.50	4.00	4.00	5.00
	% of Total N	15.4%	15.4%	15.4%	15.4%	15.4%
Special Ed Co-Taught	Mean	5.83	4.33	4.67	4.83	5.33
	N	6	6	6	6	6
	Std. Deviation	.41	.41	1.03	.98	1.03
	Median	6.00	4.25	4.00	4.50	6.00
	% of Total N	23.1%	23.1%	23.1%	23.1%	23.1%
Total	Mean	5.08	4.00	4.08	4.38	4.92
	N	26	26	26	26	26
	Std. Deviation	.98	1.44	1.20	1.30	1.13
	Median	5.00	4.00	4.00	4.50	5.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%

continued

Table H4 (continued)

Descriptive Statistics for Performance of Students With LD by Teacher Role and Model

Teacher/Model		LD participation	LD motivation	LD behavior	LD social skills	LD attendance
General Ed Resource	Mean	4.38	4.00	4.63	4.75	5.25
	N	8	8	8	8	8
	Std. Deviation	1.30	1.20	.74	.89	1.04
	Median	4.50	4.50	5.00	5.00	5.50
	% of Total N	30.8%	30.8%	30.8%	30.8%	30.8%
General Ed Co-Taught	Mean	5.25	4.88	4.88	4.75	5.88
	N	8	8	8	8	8
	Std. Deviation	.71	.64	1.25	1.16	.35
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	30.8%	30.8%	30.8%	30.8%	30.8%
Special Ed Resource	Mean	5.00	4.75	5.00	4.25	6.00
	N	4	4	4	4	4
	Std. Deviation	.00	.50	.00	1.26	.00
	Median	5.00	5.00	5.00	4.00	6.00
	% of Total N	15.4%	15.4%	15.4%	15.4%	15.4%
Special Ed Co-Taught	Mean	5.17	5.33	5.33	5.50	5.67
	N	6	6	6	6	6
	Std. Deviation	.98	.52	.52	.55	.41
	Median	5.50	5.00	5.00	5.50	5.75
	% of Total N	23.1%	23.1%	23.1%	23.1%	23.1%
Total	Mean	4.92	4.69	4.92	4.85	5.65
	N	26	26	26	26	26
	Std. Deviation	.98	.93	.84	1.01	.67
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%

Table H5

Descriptive Statistics for Performance of Students Without Disabilities by Teacher Role and Model

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
Academic progress * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
SOL progress * Teacher/Model	21	70.0%	9	30.0%	30	100.0%
Study skills * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Homework * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Classwork * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Participation * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Motivation * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Behavior * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Social skills * Teacher/Model	22	73.3%	8	26.7%	30	100.0%
Attendance * Teacher/Model	22	73.3%	8	26.7%	30	100.0%

Teacher/Model		Academic progress	SOL progress	Study skills	Homework	Classwork
General Ed Resource	Mean	5.38	5.14	4.75	4.88	5.50
	N	8	7	8	8	8
	Std. Deviation	.52	.38	.46	.83	.53
	Median	5.00	5.00	5.00	5.00	5.50
	% of Total N	36.4%	33.3%	36.4%	36.4%	36.4%
General Ed Co-Taught	Mean	5.63	5.75	5.38	5.38	5.63
	N	8	8	8	8	8
	Std. Deviation	.52	.71	.74	.52	.52
	Median	6.00	6.00	5.50	5.00	6.00
	% of Total N	36.4%	38.1%	36.4%	36.4%	36.4%
Special Ed Co-Taught	Mean	5.67	5.67	4.83	4.83	5.33
	N	6	6	6	6	6
	Std. Deviation	.52	.52	.98	.98	.82
	Median	6.00	6.00	4.50	4.50	5.50
	% of Total N	27.3%	28.6%	27.3%	27.3%	27.3%
Total	Mean	5.55	5.52	5.00	5.05	5.50
	N	22	21	22	22	22
	Std. Deviation	.51	.60	.76	.79	.60
	Median	6.00	6.00	5.00	5.00	6.00

continued

Table H5 (continued)

Descriptive Statistics for Performance of Students Without Disabilities by Teacher Role and Model

Teacher/Model		Participation	Motivation	Behavior	Social skills	Attendance
General Ed Resource	Mean	5.38	4.75	4.63	5.00	5.63
	N	8	8	8	8	8
	Std. Deviation	.52	.89	.52	.00	.52
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	36.4%	36.4%	36.4%	36.4%	36.4%
General Ed Co-Taught	Mean	5.38	5.25	5.25	5.13	5.88
	N	8	8	8	8	8
	Std. Deviation	.52	.46	.46	.35	.35
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	36.4%	36.4%	36.4%	36.4%	36.4%
Special Ed Co-Taught	Mean	5.50	5.33	5.17	5.50	5.50
	N	6	6	6	6	6
	Std. Deviation	.55	.52	.75	.55	.55
	Median	5.50	5.00	5.00	5.50	5.50
	% of Total N	27.3%	27.3%	27.3%	27.3%	27.3%
Total	Mean	5.41	5.09	5.00	5.18	5.68
	N	22	22	22	22	22
	Std. Deviation	.50	.68	.62	.39	.48
	Median	5.00	5.00	5.00	5.00	6.00
	% of Total N	100.0%	100.0%	100.0%	100.0%	100.0%

Vita

Patricia Ann Popp

EDUCATION

1985 – 1989 Virginia Commonwealth University
Richmond, Virginia
Master of Education

1976 – 1979 Boston University
Boston, Massachusetts
Bachelor of Science

PROFESSIONAL EXPERIENCES

1998 - present	The College of William and Mary, director, Project HOPE and Project STARS
1995 - present	College of William & Mary, adjunct faculty
Summer 1997	Virginia Commonwealth University, adjunct faculty
1990 - 1995	Henrico County Public Schools, teacher for students with learning disabilities in grades K-5 at Short Pump Elementary School in resource and collaborative delivery settings, special education department chairperson
1990 - 1994	Learning Resource Center, tutoring, strategy instruction, educational evaluations
1988 - 1989	Virginia Commonwealth University, project coordinator for a federally funded research project studying successful adults with learning disabilities
1980 - 1985	Hanover County Public Schools, teacher in a self-contained classroom for students with learning disabilities grades K-3 at Henry Clay Elementary School